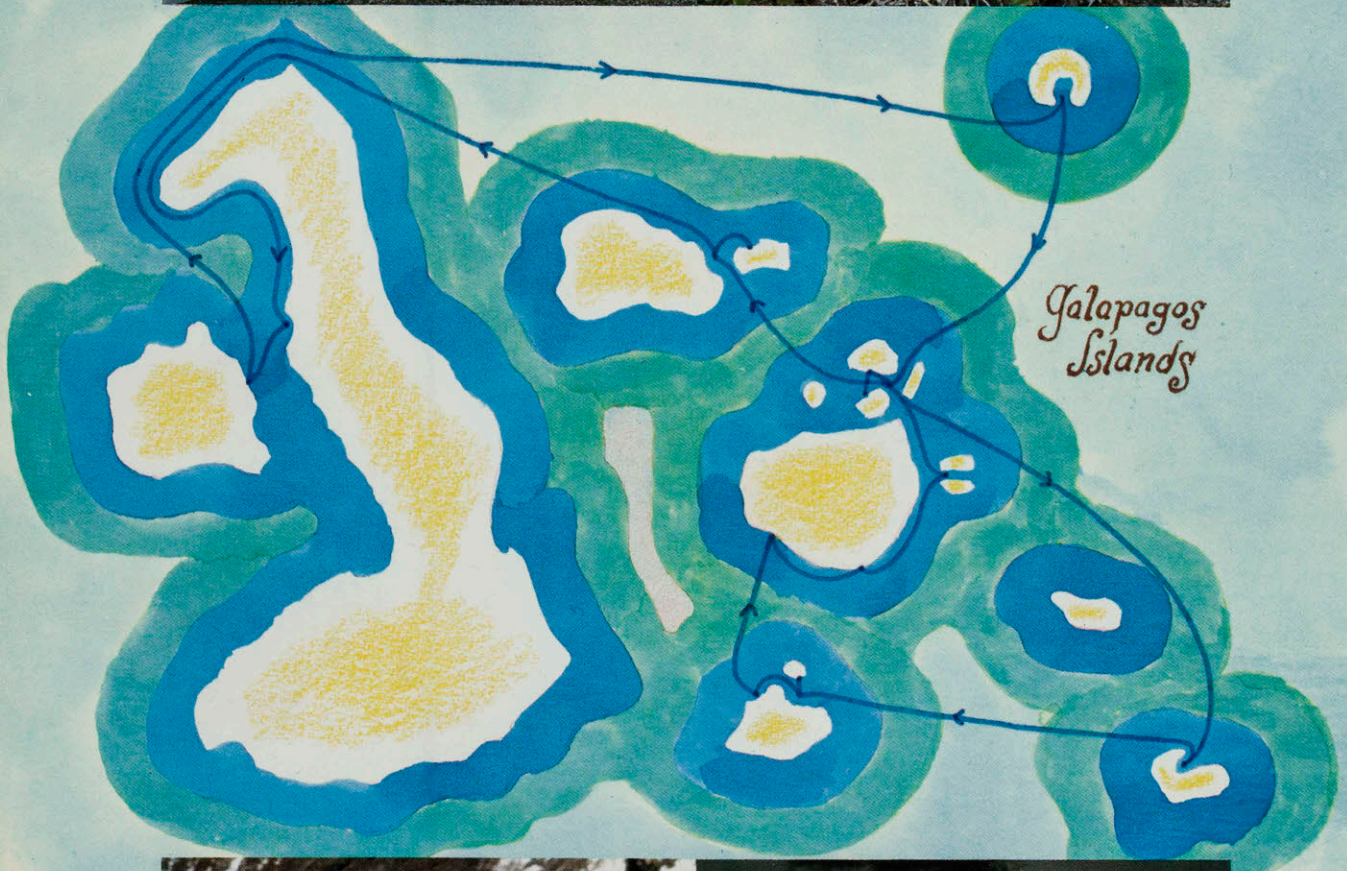
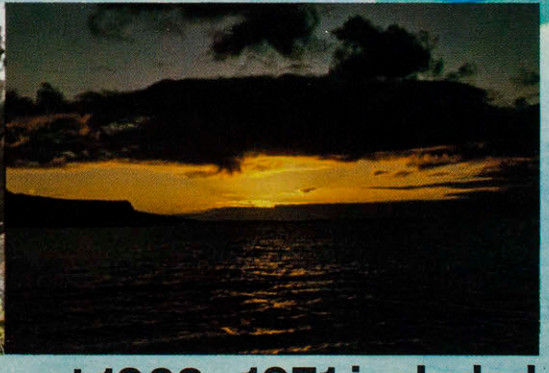
THE QUARTERLY MAGAZINE OF THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY
VOL. 10/NO. 3 WINTER 1972

Terra





Biennial Report 1969–1971 included

All Honor, Laud, and Glory

Museum Alliance Board members include many a *rara avis* who can soar to high accomplishments, all the while keeping Museum interests close to heart.

Jane Dart (Mrs. Justin Dart) has been appointed by President Nixon to the Commission of Fine Arts of the United States of America. This commission, established by Congress in 1910, consists of 7 judges — each appointed for 4 years — who advise on the location and type of statues, monuments, fountains, and other public adornments in the streets and parks of Washington, D.C. The judges also advise on the selection of models and artists. Mrs. Dart has served 3 years on the California Arts Commission, to which she was appointed by Governor Reagan. She is currently a member of the Board of Governors of our Natural History Museum, having shown her faithful interest as a Museum Alliance board member for many years. Her fine art in research and writing delighted *Terra* readers in her recent article on the narwhal. She continues to serve on the Editorial Board of this magazine.

Katharine Bixby Hotchkis (Mrs. Preston Hotchkis), until recently a long-time honorary director of the Museum Alliance and presently a member of the *TERRA* editorial board, is author of *Trip With Father,* her second book to be published by the California Historical Society. The Society also has just brought out a revised edition of her *Christmas at Rancho Los Alamitos,* originally published by the Society in 1957 and long out of print.

Mrs. Hotchkis, a current trustee of the California Historical Society, is a member of the Pioneer Bixby family, who lived for some 90 years in the well-known old adobe house of Rancho Los Alamitos. In 1968 this site was given by the Bixby family to the City of Long Beach and is now open to the public. Three generations lived there when it was the headquarters for large sheep and cattle ranching operations. The fourth generation frequently played in their great-grandfather's barn, and the very young fifth generation (including Mrs. Hotchkis' 10 grandchildren) have loved to picnic in the garden and feed the ancient goldfish in their great-grandmother's Spanish fountain.

Trip With Father was written for the benefit of the grand and great-grandchildren of Fred H. Bixby ("Father"). It is the story of a remarkable horseback ride made in 1916 by Mr. Bixby and his three daughters, ages 16, 14, and 12. Starting from Piedmont, across the Bay from San Francisco, and ending at Rancho Los Alamitos, south of Los Angeles, they rode some 522 miles — an average of 37 miles a day for 14 consecutive days. An amazing record — though at the time such a thought was far from their minds!

Terra Editor **Dorothy Seligman** (Mrs. Ewing Seligman) has written a new children's book, *The Trouble With Horses,* which was a January 1972 Junior Literary Guild selection. Two years ago her *Run Away Home* was chosen for the Child Study Association of America List of Best Children's books of 1969.

Mr. Robert A. Weinstein, a member of the Alliance Executive Board Research Panel and a member of Terra's Editorial Staff was recently honored with an appointment to the staff of the Bernice P. Bishop Museum in Honolulu, as a Research Associate in Maritime History. He was as well recently elected to the Executive Council of the American Association for State and Local History and is serving currently as a member of their seven member National 1976 Bicentennial Commission of the American Revolution.

Ethnic Gifts Galore!

The Ethnic Gift Shop is now openly inviting on the Museum first floor. Tribal treasures, masks, bowls, beads, you name it, if it's ethnic, we've got it!

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THE NATURAL
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of Los Angeles County
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Las Islas Encantadas

by **Gretchen Sibley**

Under soft blue skies and drifting white clouds the sea was rough and our small tender plunged and rocked through the waves to be skillfully guided against the rough lava boulders of North Seymour Island in the Galápagos. Crawling and slipping up the wet lava, we found ourselves on a desert-like island covered with low brush and clinging ground plants between outcrops of lava. Blue-footed boobies flew out to sea, dove for food and returned to nesting sites on the bare ground. Male frigate birds blew out scarlet throat sacs to attract the females. From the shore sea lions wriggled through paths among the mangroves to greet us and drop exhausted to sleep in the sun. And along a nearby bay, brilliant red sally lightfoot crabs darted sideways across the white sands and black lava to disappear in the foaming surf.

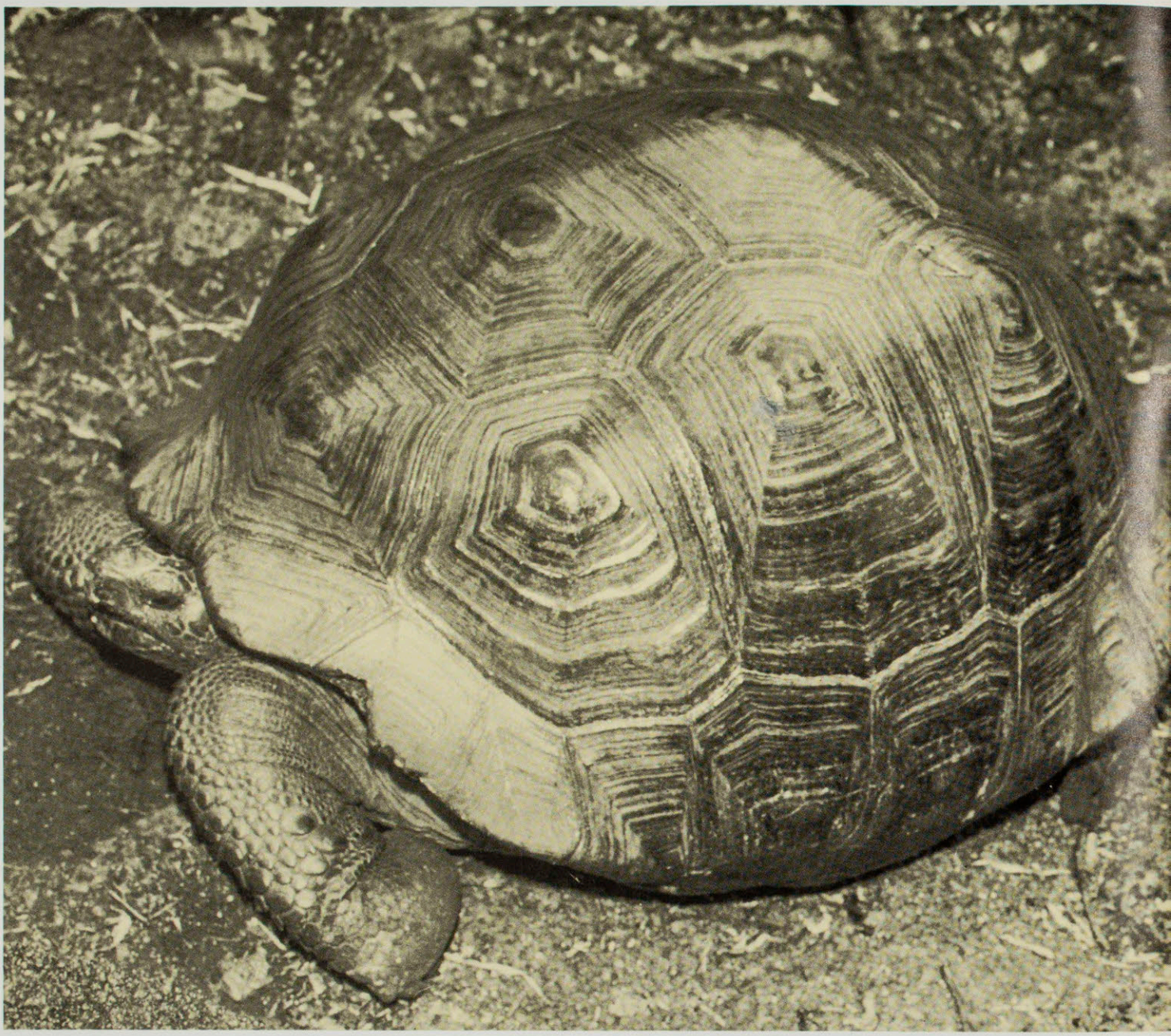
This was our introduction to *Las Islas Encantadas,* the *Enchanted* or *Bewitched Islands,* so named by early Spanish sailors who were sure the islands moved mysteriously about in the sea. But the more common names are *Galápagos Islands* and the *Archipelago de Colón.* And on California tuna boats they have earned the name of *rock pile.*

These are the islands made famous by Charles Darwin who was inspired by their life forms to write *Origin of the Species by Means of Natural Selection,* a presentation of his theory of organic evolution.

These volcanic islands probably originated several million years ago, are located 600 miles west of the coast of Ecuador, cut by the equator and bathed in the cool waters of the Humboldt current. Rising from the antarctic, the current flows by the coast of Chile and Peru before swinging west to reach the Galápagos. No doubt debris containing life forms collected along the South American shores traveled in the current to the islands. Even today logs are beached against the rocks and sand after their long trip from the mainland.

The first recorded discovery of the islands was made in 1535 by Fra Tomas de Berlanga, the first bishop of Panama whose ship to Peru was blown off course and reached the Galápagos. While he found the islands uninviting, he gave an interesting account of the sea lions, tortoises, iguanas and the tameness of the birds.

Was this man's first visit? Possibly an early Inca king, Tupac Inca Yupan-



All photos by Gretchen Sibley

The Galapagos Tortoise

qui, was the first visitor to two of the islands at the end of the fifteenth century. Ecuadorean maps still bear the names he bestowed upon the islands: Nina-Chumpi and Huahuachumpi.

British privateers and buccaneers often visited James and Charles islands in the 17th century on their way to sack South American coastal towns and prey upon Spanish galleons carrying Peruvian gold to Spain.

Whales and fur seals near the islands attracted whaling vessels in the 18th century and their visits continued till the 1860's. Fur seals were almost wiped off the islands by these men and thousands of tortoises were collected as "live" food, stacked in the holds of the ships and killed for food and oil as needed. In 1812 an excellent account of the plant and animal life was left by Capt. David Porter of the U. S. Navy. He commented on the tremendous numbers of animals, particularly the tortoise. But in the following years most of these were removed by the whalers.

Ecuador took over the islands in 1832 and changed the English names to Spanish. But with so many visitors over the years, some islands have as many as eight names; a confusing situation for a visitor.

In 1835 a vigorous and enthusiastic young scientist, Charles Darwin, spent five weeks on the islands and made some important observations which would soon change the thinking of scientists all over the world. Prevalent at this time was the theory that there were *centers of creation* scattered over the earth and once a species was created it did not change. However, Darwin's comparison of plants and animals on the mainland and on the various islands revealed variations of certain forms in each new location. In time he was to develop the theory that each type of organism was changed by its natural environment — *Origin of the Species by Means of Natural Selection* published twenty-four years later.

Even in Darwin's time many changes in the natural plants and animals had begun to take place. As the islands lost their rich supply of tortoises, ships brought goats to reproduce and provide food for later trips, and early settlers lost domestic animals to the wilds of the islands. The barren islands provided scarce food for the new animals and the competition resulted in a great loss among the natural animals, particularly the tortoise. Feral animals sought out tortoise nests to feed on the eggs and further loss resulted.

It was inevitable that man would eventually come to live in the islands. A marooned Irish sailor, Patrick Watkins, was the first known inhabitant. He arrived in 1807. He was a wild, redheaded character who lived a Robinson Crusoe existence and captured sailors to retain as slaves. He escaped the island of Charles two years later in a stolen whale boat. Since the slaves disappeared it was assumed that he either threw them overboard or ate them!

Charles Island also became the home of the first colony which was established in 1832, but most of the members were convicts unable to maintain the colony.

In the following years the population increased as convicts, European refugees and Ecuadoreans sought land and livelihood on the forbidding islands. Today the islands house over 3000 farmers, fishermen and business men. Most live on Chatham while smaller numbers are found on four other islands. The remaining forty-five islands are uninhabited by man.

1934, and Ecuador became concerned about its unique islands. It passed laws making it illegal to export native animals from the islands and the first efforts were made to destroy feral animals.

Following a survey made in 1957 by such organizations as UNESCO, the International Council for Bird Preservation and the New York Zoological Society, the Charles Darwin Foundation was established in Brussels. It set up the Charles Darwin Station on Santa Cruz Island in 1959 on the 100th anniversary of the publication of Darwin's book. The station encourages conservation on the islands and provides research opportunities for visiting scientists. Encouraged by this work, the Ecuadorian government established all land on the islands as a National Park. Only privately owned land is outside this reserve.

Until recently it was difficult to reach the Galápagos and travel from island to island, but today the scientist and interested layman may travel in relative comfort. We began our journey in June, 1971. After a visit in the highlands of Ecuador and a wild train trip to the coast we flew to Baltra, one of the Galápagos Islands which boasts the second longest runway in South America. The size seemed out of proportion to the islands until we found that the U. S. had built it during World War II to protect the Panama Canal.

The flat island is one of a group of three small islands north of Santa Cruz. And on this day in June the waters bathing its shore were as beautiful a blue as the Mediterranean. Our ship anchored in it while we traveled by tender to North Seymour, a pleasant introduction to Las Islas Encantadas. After visiting the animals we sat on the lava beside the shore and watched the birds struggling against the wind as they soared high over the water and flew low to feed at the surface. And the blue footed boobies rose fifty feet into the air and dove headfirst controlling their dive with their tail feathers. They may travel another fifty or sixty feet deep in the water or break their dive in shallow water.

Back in the tender for a rough trip to Isla Mosquera for a landing on the beach and we waded ashore. Great black lava rose beyond the shore and sea lions sat bronzed by the setting sun. The young curled up asleep in the sand or rested in crevices on the rocks. One young male stretched out sound asleep in a nearby tide pool, almost covered by the low tide but with one nostril exposed for air.

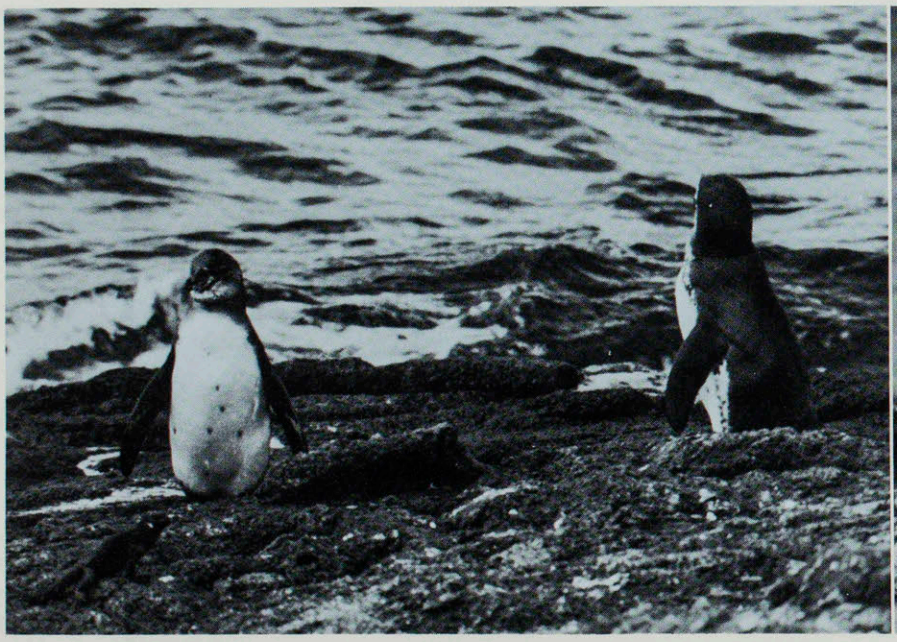
We traveled by night to Hood Island for an unforgettable visit with the animals. The surface of the islands seemed covered with nesting sites of the blue footed booby and Galápagos albatross. Birds nested so close together it was difficult to watch both the rough terrain and avoid stepping on a bird.

Blue footed boobies spend nine months of the year in some process of courting and raising young and all phases are going on at the same time on the island. Courting couples bow and stretch their necks, walk about and raise large, beautiful, skyblue webbed feet for each other to admire. Nests are hollowed out spots in the ground where two tawny eggs are laid. Either male or female takes its turn on the nest while the other fishes near the shore. Hatchlings are snowy white but soon show the dark gray feathers of wings and tail.

The first plumage of young adults is dark and the feet are brown, but by maturity the head feathers lighten and the feet turn blue. We moved cautiously across the island with an occasional whistle or honk, warning that we had come too close to a nesting booby.

Along the high cliffs the albatross

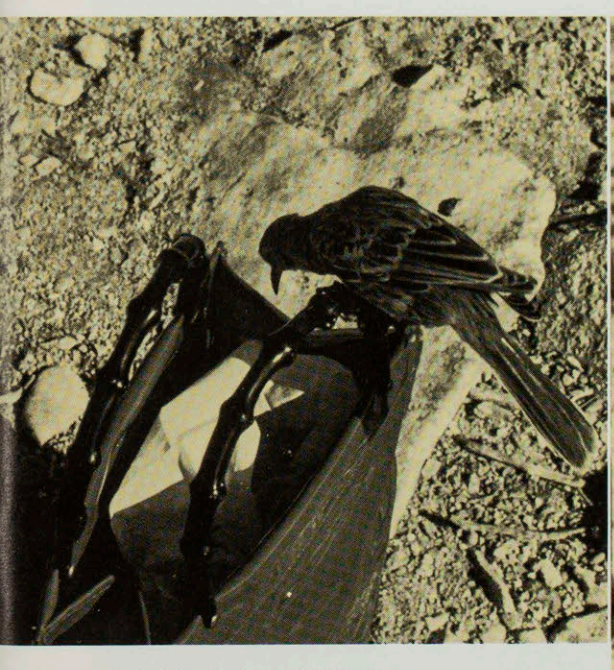
Lava worn smooth by the soft
bodies of sea lions



Penguins stare out to sea

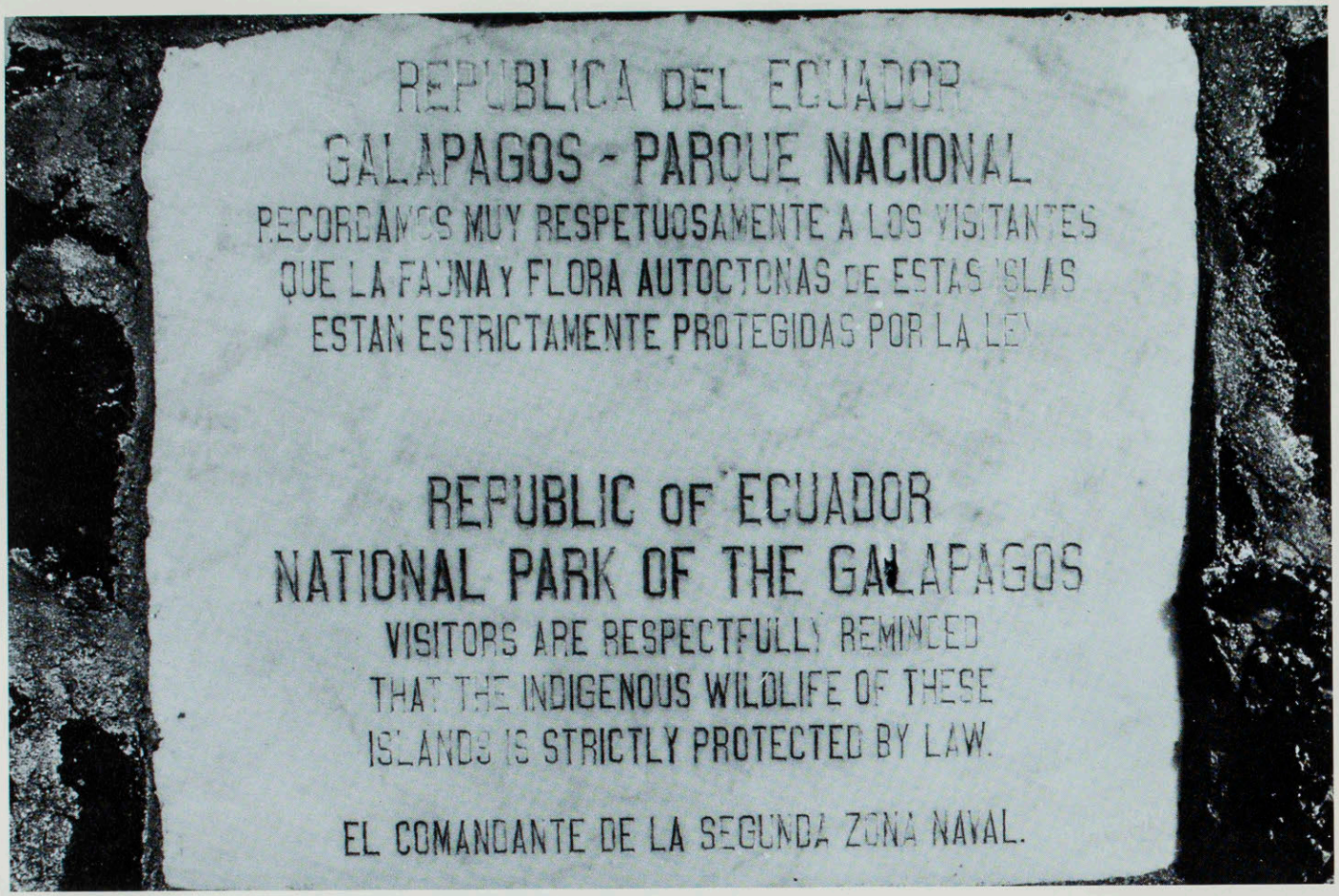
Flightless Cormorants stretch
ragged wings to dry in
the breeze

White sands and black lava
stretch to the blue sea



A fearless mockingbird checks
the camera case

A friendly land Iguana
greets the visitors


REPUBLICA DEL ECUADOR
GALAPAGOS - PARQUE NACIONAL
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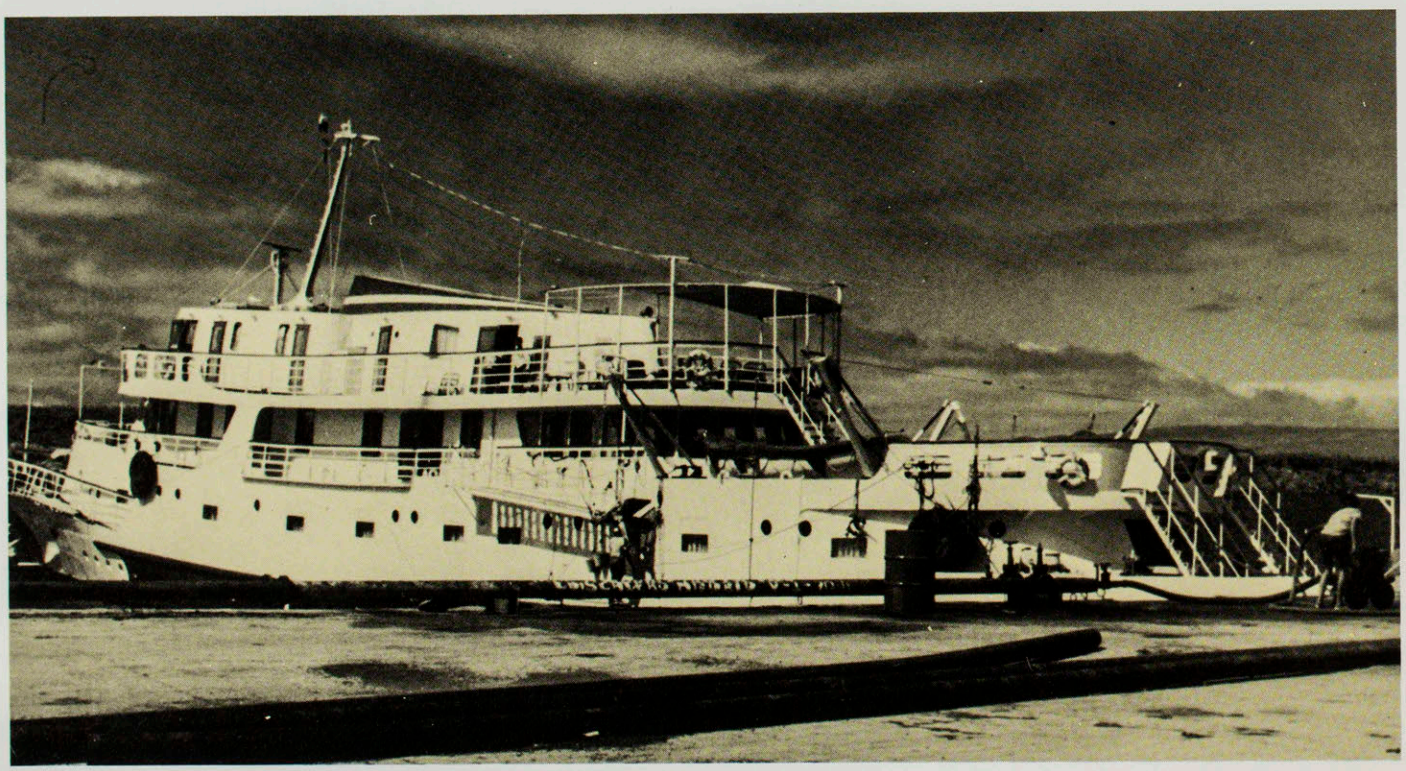
VISITORS ARE RESPECTFULLY REMINDED
THAT THE INDIGENOUS WILDLIFE OF THESE
ISLANDS IS STRICTLY PROTECTED BY LAW.
EL COMANDANTE DE LA SEGUNDA ZONA NAVAL.



Home on the Galapagos

soared in the wind and scattered among the rocks and bushes were dozens of albatross nesting. A single egg is laid on bare ground, protected by a handsome gray albatross with white head shaded with yellow and blending into the grays of the chest and back.

Beyond the nesting several courtship dances were in process. One bird lowers its head and clacks the long slender yellow beak together while the other raises its head to the sky and "moos." Then both fence with their beaks to produce a loud clatter as they strike back and forth.

A few waddle awkwardly to the edge of the cliff, legs wide-spread under the wide heavy body. A current of wind provides the necessary lift for them to take off and they soared high and far in search of food. But one egg is laid, for food can be supplied for only one bird. Upon the parent's return, oil from feeding on fish is regurgitated for the young albatross.

By December the birds will leave not to return for two years and the intervening year will find the other half of these albatross nesting. They alternate between the Galápagos and the coast of South America.

A constant companion on my hike across the island was a small mockingbird who hopped on the camera and investigated the camera bag whenever possible. These friendly birds seek water and are rewarded with fruit juice at the end of the journey. The fearlessness of the Galápagos animals is an outstanding and endearing trait.

Another common animal on Hood is the marine iguana. While most iguanas are plant-eating land forms, the marine iguana evolved as it was forced to seek seaweed for food. And because the seaweed along the shore became scarce, the animals began to travel into the sea. The body changed; shorter jaws, flattened tail and long toe nails aided in swimming and climbing. Since they stay under water for an hour, the heart slows and permits blood only to the vital organs. Salt glands in the nostrils expell excess salt. I sat one afternoon watching a group warming themselves on the rocks after a cold swim, shooting sprays of water out of both nostrils. Even among the marine iguanas evolutionary changes have occurred. On one island they are about a foot long, on another they may grow to two or more feet. All varieties are dark gray or black except those on Hood which are irregularly blotched with red. And the soft dorsal spine of another variety are white tipped.

From island to island we traveled through seas of gray or blue or green, across rough lava or sandy beach, through mangrove and light brush and forest, always alert for new plants and animals. Volcanic tops reached into the clouds and sent long fingers of lava to the sea. Cactus struggles in the bits of soil and older islands sprouted with brush and grass. Along the shore white sand stretched and melted into dark cliffs, or black sandbars pushed above the water to form resting spots for hundreds of dark iguanas, sea lions and shore birds in their midst. Treasures of shell and bone and coral mingled with the grains of sand.

Brilliant pink flamingos lined the shore of small ponds close to the shore and vermillion flycatchers darted among the mangroves to perch close to our heads. The many varieties of Darwin's finches flew about and we observed the evolution of bill structure in this species: from slender bills for insect food to thick bills to crack seeds. These adaptations to a limited supply of food on the various islands made a great impression on Darwin.

Flightless cormorants nested on the lava, plunged into the water for food and crawled back to the rocks to stand quietly in the breeze, ragged wings stretched wide to dry. While nearby penguins stood like statues looking out to sea.

Tracks of the fiddler crabs made patterns on the sand, broken by the wide path of a sea turtle laboriously pulling herself over the sand to lay her eggs high on the shore.

Graceful offshore birds swept over the sea; white tropic birds with trailing white feathers, fork-tailed frigates, swallow-tailed gulls and terns. Pelicans and petrels skimmed the water and shear-waters ran along the surface of the water with wings aloft like small sailing ships.

Plaza Island tilts out of the sea and as we landed on the shore the land iguanas crawled down to meet us. Land iguanas come in assorted colors of yellow, brown or gray and peeling skin does nothing to enhance these creatures considered so ugly by Darwin.

Harems of sea lions rested on the lava rocks stained white with urine and worn flat from the soft bodies dragged across the surface for thousands of years. Pups nursed and played and one loudly voiced his displeasure over his swimming lesson. Each harem is guarded by a male who patrols the waters. And sometimes one patrols high on the rocks as I discovered while studying lichen and inadvertantly crossing between him and his harem. Racing over rough lava rocks charged by an angry sea lion is not a recommended activity. Bachelor sea lions learn this early in life and must climb steep cliffs on the far side of Plaza to rest away from the forbidden harems.

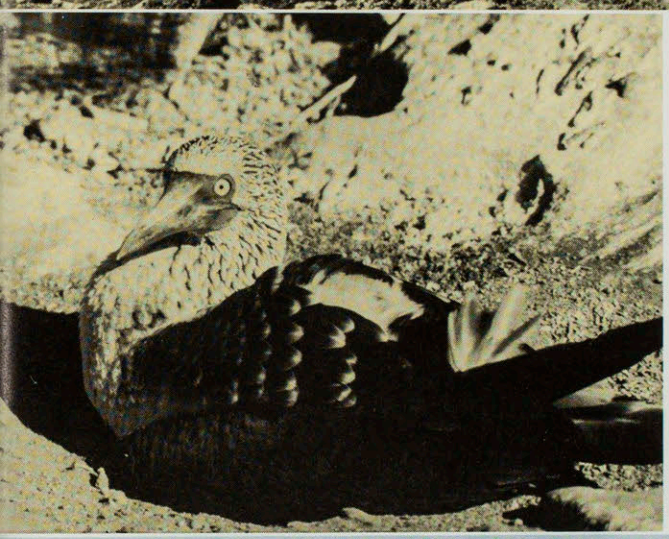
Small colonies of fur seals still live on the islands, rest on the rocks and play in the surf. They play with anything, including swimming tourists.

We must not forget the tortoises for whom the islands are named. Only in thick forests high on the islands are these sturdy giants still to be found. But at the Darwin Research Station on Santa Cruz Island, eggs from many islands are rescued from feral animals, hatched and the young raised in safety. They spend their early days in the tortoise house and are then moved to rough pens resembling their natural habitat. At four years of age they are released on their home islands. Again evolutionary changes are noted, for each island has a slightly different tortoise. Differences may be in the shape of the shell, the length of tail or neck, or a change in some other body structure. An interesting plant association is shown by the opuntia cactus upon which they feed. On tortoise-populated islands the ground hugging opuntias have developed tall trunks to survive the voracious appetites of the tortoises. Islands with normal, low growing opuntia have never had tortoise inhabitants.

We left our last island at sunset traveling over the quiet waters reflecting the gold and rose of the brilliant sky, gray islands silhouetted in the distance. Do they mysteriously move in the fading light? — Las Islas Encantadas!

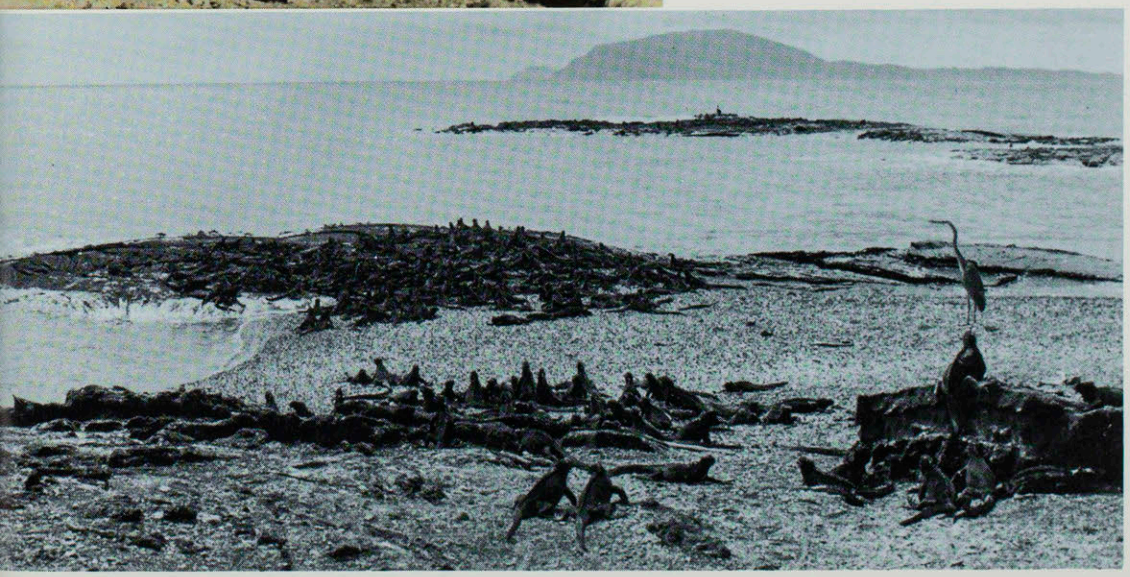
Gretchen Sibley, Education Specialist of the Natural History Museum of Los Angeles County is the author of numerous books and articles. Her scientific journeys frequently result in lively essays for publication in Terra.

Low brush cover

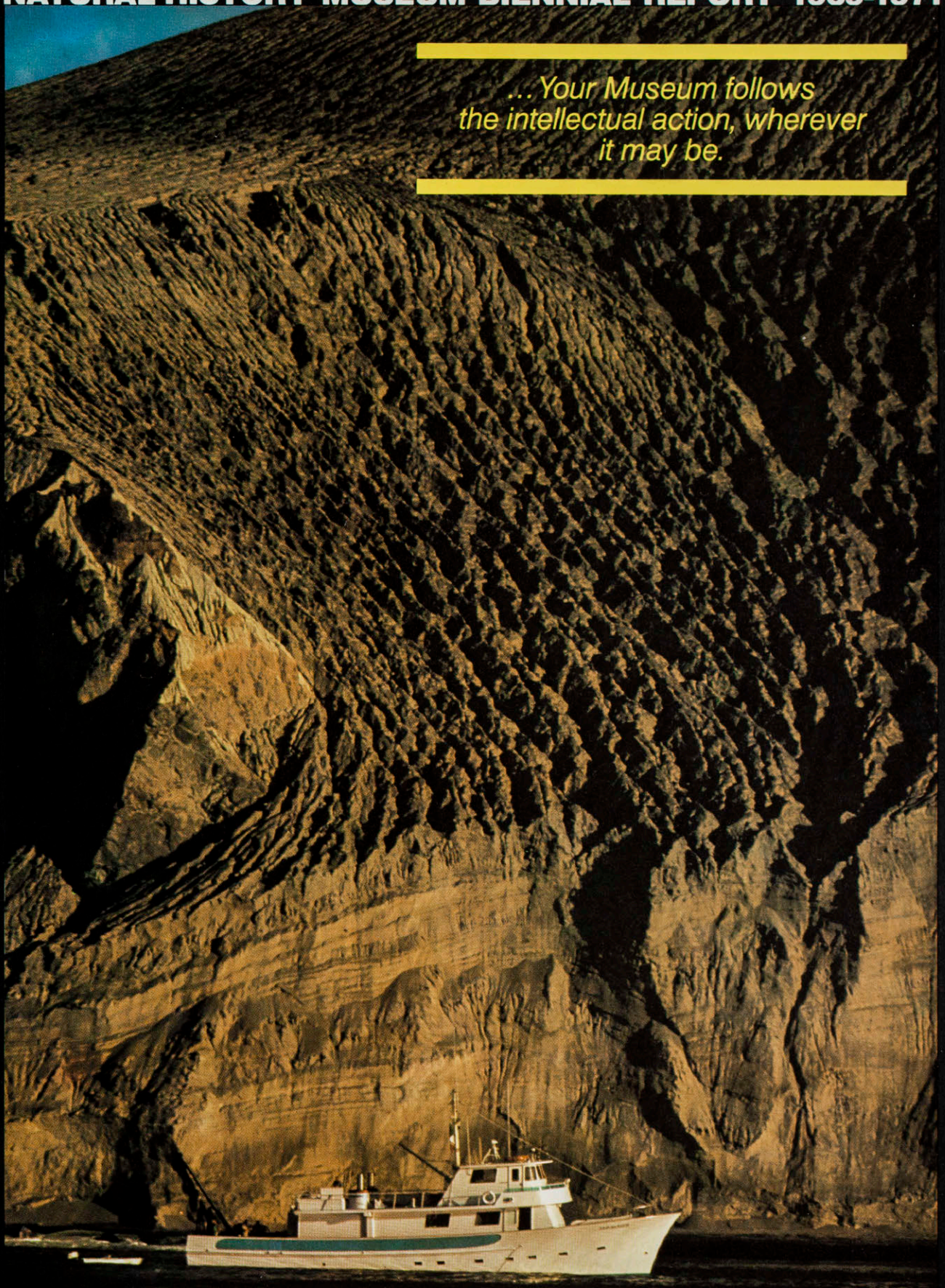


A blue footed Booby nesting

Black Sandbars provide rest
for marine Iguanas



NATURAL HISTORY MUSEUM BIENNIAL REPORT 1969-1971



... Your Museum follows the intellectual action, wherever it may be.

BIENNIAL REPORT, 1969-1971

The Natural History Museum of Los Angeles County

Every other year your Natural History Museum presents in synoptic form an account of its activities, its successes, its aspirations and its failures. Some data come easily, for curators and registrars are good record keepers. Other data is more elusive. Our monolith in Exposition Park is easy to find but the rest of your Museum follows the intellectual action, wherever it may be. That action spans the world from Montana to Madagascar, from ten thousand feet above sea level to several thousand below, from plant genetics to Roman armor, and from tourmalines to Los Angeles schoolchildren. Your Museum is responsible to the people within Los Angeles County. Its mission, however, is to bring the world of natural history and of man—the world on both sides of the county line—to the community. Little by little we bring the excitement of intellectual and geographical exploration into the products of meaningful research and then into the primary purpose of our existence; a purpose best characterized as recreational education. We choose to begin this synopsis of Museum activities beyond the bounds of Exposition Park and to close with some telling compilations of its contributions to the community that your Museum is here to serve.

Whenever we think that we've misplaced a paleontologist we look for a hole in the ground. The past two years have produced several: the continuing excavation of the great carnivorous dinosaur, *Tyranosaurus rex,* from the plains of Montana; the excavation of an ancient fauna in the Anza Borrego Desert; of giant reptiles from the deserts of Baja, California; of the fossil whales of San Pedro and Mississippi; and of early man and the extinct fauna that roamed what is now the desert east of the southern Sierras. Closer to home base, your Museum and its friends are once again wallowing in the tar at Hancock Park, not just to recover more remains of the large and famous saber-tooth cats and mastodons that rambled along Wilshire Boulevard twelve thousand years ago, but to concentrate on a difficult and far more relevant task: to painstakingly analyze everything entrapped in that 50-foot column of tar, from pollen grains to mouse teeth, and to reconstruct from these data the ecological history of this one piece of the Los Angeles basin.

Not all of our holes in the ground are chosen by our paleontologists. These are times of stifling population pressure and earthmovers are running rampant better to meet the needs of a burgeoning community. Too often "progress" can't wait, and treasures preserved by nature for eons are abruptly ground to dust beneath a sheepfooter or shattered on the blade of a bulldozer—an irretrievable loss of priceless material. Increasing numbers of people are saying that there must be time to look at this treasure before it's too late: the roadbuilders who call the Museum when the blade hits bone; Johns Manville at Lompoc, who generously and regularly helps us recover invaluable Miocene marine fossils; and Atlantic Richfield, who encouraged us to collect and hold for posterity the memorabilia of an ancient shoreline now buried beneath their skyscrapers at Sixth and Flower Streets. In spite of the crisis following the big shake of February 9, 1971, Southern Pacific took the time to salvage the real objects that enable this Museum to show the public the awesome power of an earthquake.

These fast breaking, essentially brushfire operations occasionally give us the desperate feeling that we are slighting our major mission to save what little we can of our environmental history, whether it be of the Los Angeles Basin or the fast-disappearing tropical rain forests of Central America. It is true that we are spread too thin and we can't do all that needs to be done. We are few. The jobs that urgently require immediate attention are many and the curatorial week still contains only one hundred and sixty eight hours.

Through the generosity of the Museum's many friends our biologists have been able to continue their studies of floras and faunas far different from those found here and return with fine material of great educational value. Our curators have variously been immersed in the rain forests of Central America, have peered into crab holes along the adjacent shores, and have studied fish working the still undisturbed algal plains of the Caribbean. Others have been in Africa, pursuing their own research interests while gathering specimens that enable us, through our habitat groups, to bring synoptic pictures of other environments and their animals to our visitors. Still others are studying the prehistory of the Channel Islands off Santa Barbara, collecting new relevant data on the battle of San Pasqual, or dissecting and reassembling the threads that form the cultural web that is Los Angeles. Some of these adventures reach the community through the electronic media; others ultimately through Museum exhibit halls, and many reach the public through *Terra,* the quarterly magazine received by all fortunate enough to be members of your Museum through its Alliance. These activities are wide ranging and seldom publicly financed, but their ultimate motivation is always rooted in the needs of this community.

While field exploration is always a part of any good museum's activity, we point here with special appreciation to a significant new departure from prior Museum activity. Our salt-water biologists and their collaborators in local universities and certain state agencies have long harbored the gnawing realization that our California coastal waters are in trouble and that current research and remedial action are inadequate. They have observed the ravage of Farnsworth Bank, a faunally unique area off Catalina Island dominated by blue coral. They know the inadequacies of the effort devoted to the study of the marine fauna and flora off the coast of sites being considered for thermonuclear generators, but they viewed themselves as shorebound and unable to contribute their expertise to these questions. Chance, the meeting of minds, and mutual concern for conditions along our coast have resulted in a happy alliance. A fully equipped 85-foot ship, the Research Vessel *Searcher,* together with back-up support has been made available by the Janss Foundation. The R. V. *Searcher* is a regional and interinstitutional facility available for marine research on a scientifically competitive basis, and its headquarters is in your Natural History Museum. The Janss Foundation has opened for our marine scientists a door they've been scratching on for years—access to the sea.

These activities and many others like them are not ends in themselves, nor do they stand as milestones of educational or scientific achievement. Specimens salvaged from the earthmoving activities of man or from floras and faunas perilously near extinction are of value only as they can serve as tools for education or for the solution of some of the problems now so abundantly evident everywhere. In some instances the relationship between field work and results is clear: the reef material taken by R. V. *Searcher* will go straight into our developing *Hall of Marine Ecology.* Raquel, San Pedro's fossil whale, will soon make her debut in scientific literature and then will be loaned to the Cabrillo Beach Museum for the pleasure of that community. *Tyranosaurus rex* will in time gaze down at our visitors as they enter the Museum's foyer. Frequently, however, the path from field work to result is less direct, less straight, but no less important.

One of the primary purposes of any museum worthy of the name is the orderly preservation of important scientific and historical material; collections that provide the basis for research leading to new and useful knowledge. Such material varies, and varies unpredictably. It may be a single document of historical significance, or it may be a collection of mollusks numbering in the thousands. The problem is simple. If these collections are not assembled and made available, new knowledge will not be forthcoming. But no institution other than the Smithsonian can afford in-depth collections in all scholarly areas. This Museum must balance its strengths and desires with its limited staff and resources—a continuing battle. There are areas in which the Museum wants only enough excellent material to form an exhibit with powerful educational impact, but there are other areas in which the Museum needs accumulated material adequate for the serious production of new knowledge. Archives delving into the history of our own Southwest, its indigenous people and its settlement, a collection recently expanded with the addition of the photographic archives of "California Pictorial," is one such area. Another interrelated and increasingly significant area, collections in the life sciences, deserves expanded comment: Some knowledge

NATURAL HISTORY MUSEUM STAFF

...Little by little we bring the excitement of intellectual and geographical exploration into the primary purpose of our existence; a purpose best characterized as recreational education.

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George P. Kanakoff, B.A.	Curator Emeritus, Invertebrate Paleontology, Natural History Museum of Los Angeles County	Invertebrate Paleontology
Arnold G. Kluge, Ph.D.	University of Michigan	Vertebrate Paleontology
Nicholas A. Kormilev, Eng. Agron.	Natural History Museum of Los Angeles County	Entomology
John M. Koroloff, M.A.	U.S. Department of the Interior	Mammalogy
George Kritzman, A.B.	Los Angeles Police Department	Archeology
James R. Lance, A.B.	Scripps Institute of Oceanography	Invertebrate Zoology
Virginia Langenheim, M.A.	California State College, Los Angeles	Invertebrate Paleontology
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Ronald Leuschner, M.S.	Natural History Museum of Los Angeles County	Entomology
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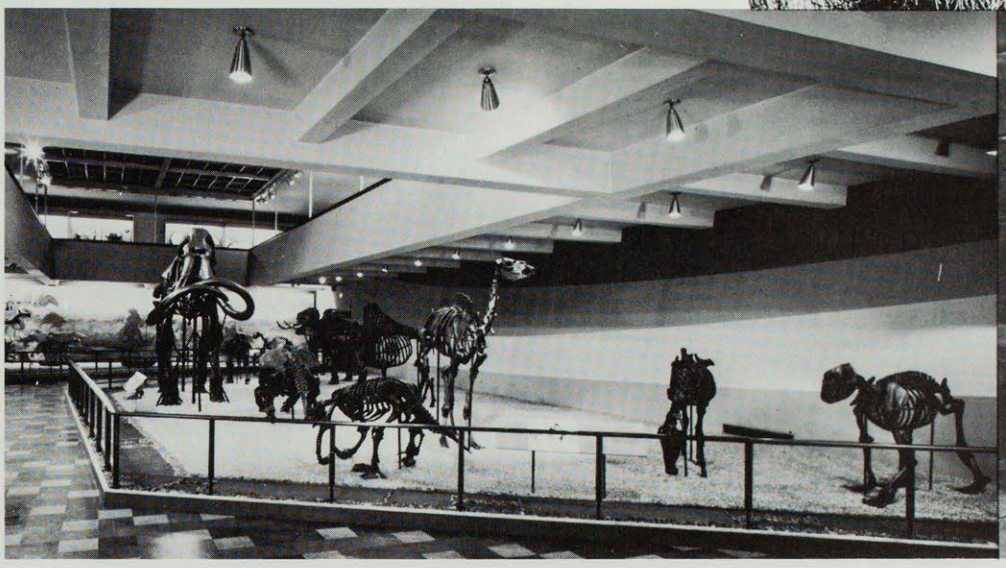
Jason A. Lillegraven, Ph.D.	California State College, San Diego	Vertebrate Paleontology

MUSEUM EXHIBITS 1969-71



Permanent Galleries Opened

Hancock Hall—The Ancient Life of Rancho La Brea
Leopard, Pangolin and Chimpanzee Groups, Habitat Halls
Phantasmagoria—The Movies

Permanent Galleries in Preparation

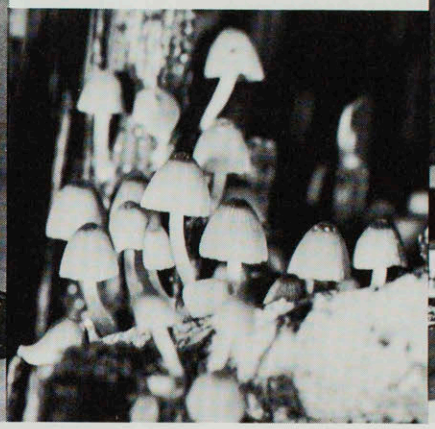
Cenozoic Mammal Hall
Hall of Marine Ecology
History—The Western Movement
Mesozoic Dinosaur Hall

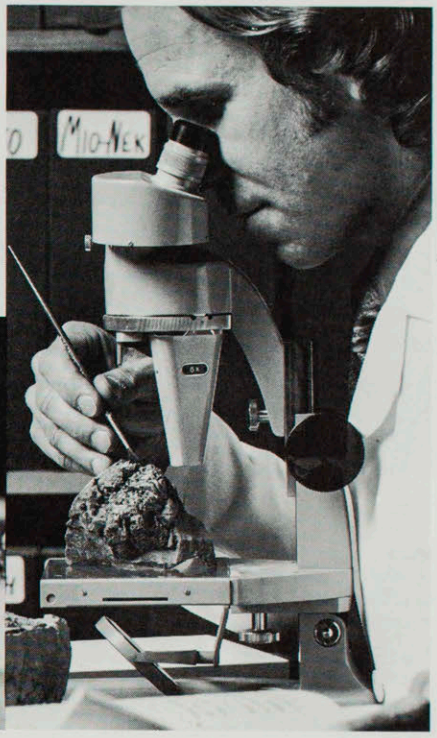
Temporary Exhibits

Amelia Earhart
America's Black Heritage
Ancient Art of Vera Cruz
Architecture of Chicago
Art of the American Indians
Baby Dinosaur
Baskets of the Pomo Indians
Bottles for Snuff
British Medals
Bunker Hill Paintings
Butterflies, Nature in Art
California Bicentennial
California Concretions
California Indian Baskets
Christmas circa 1923
Coco de Mer
Drumwright Drums
Earthquake
Ecce Homo
Five Hundred Years of Botanical Illustrations
Fossil Shoreline Beneath the Richfield Plaza
Great Auk
Hakenbuchse to Cartridge
Herpetology
History of the Union Pacific Railroad
Insect Microprisms
La Vallette Collection of Memorabilia
Living Beneath the Sea—Tektite II
Many Forms of Calcite
Medicinal Plants
Military Miniatures
Minerals from the Fabulous Tsumeb
Minerals of Great Britain
Movie Posters
Narcotic Plants
Oar Fish or Sea Serpent
Pace Photographs
Pacific Coast Shells
Plymouth Rock
Poisonous Plants
Rancho La Brea Woman
Razor's Edge
Sam Colt and His Imitators
Scanning Electron Microscope
Skull of the Sabertooth
South American Feathered Artifacts
Tanzanite, the New Gem from Africa
Whales of Mississippi

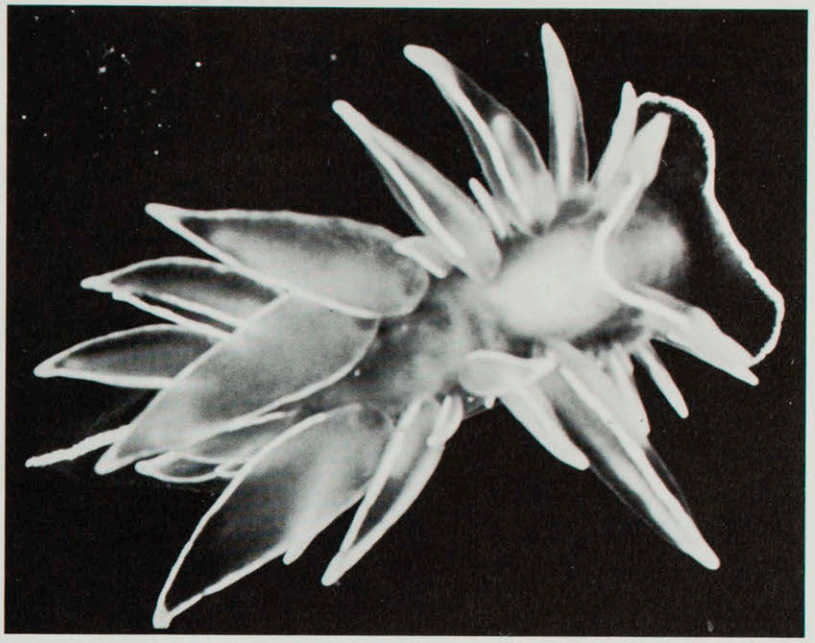
Societies or Organizations Regularly Meeting in or Headquartered in the Museum.

Association for the Advancement of Biomedical Education
California Natural Areas Coordinating Council
Conchological Club of Southern California
Horseless Carriage Club of Southern California
Lorquin Entomological Society
Micromineralogists of Southern California
Mineral Research Society
Orchid Society of Southern California
Pacific Shell Club
Southern California Academy of Sciences
Southern California Biosystematists
Southern California Historical Society
Southern California Paleontological Society





Mr. Lavenberg	The food and game fishes of California; the shore fishes of California; the Cenozoic fishes of the Whittier Hills; studies on the oceanic swallower fishes (Pseudoscopedidae); of the gonostomatine lightfishes of the genera *Woodsia* and *Ichthyococcus;* of the anglerfish family Gigantactinidae, and of the ronquils, *Rathbunella;* research required to establish protected status for Farnsworth Bank west of Catalina Island; and comparative studies of coastal areas adjacent to proposed southern California thermonuclear generators.
Mr. Lester	Mammals of the Mojave Desert; systematics of Costa Rican rodents and of the genus *Reithrodontomys;* and intraspecific variation in the Kangaroo Rat, *Dipodomys microps.*
Miss Lowe	Studies on the inclusions in Dish Hill basalts.
Dr. McLean	Marine gastropods, Alaska to California; hybridization in abalones; the eastern Pacific Turridae and Archaeogastropoda.
Mr. G. Miller	Possible evidence of human history at Rancho La Brea; functional morphology of the saber-tooth cat, *Smilodon.*
Mr. Neumann	The biology of the sharksuckers, genus *Remora.*
Mr. Northern	Hybridization in the neotropical bird genus *Ramphocelus.*
Mr. Patten	Studies of Costa Rican, East African and Mexican mammals; revision of the *Artibeus jamaicensis* complex.
Dr. Rozaire	Pre-history of the Channel Islands; archeology of Vasquez Rocks; Los Angeles County, and of the Dyke Ranch Cliff dwellings.
Mr. Snelling	Biology and taxonomy of western American ants; revisions of the bee genus *Hylaeus* and of the ant genus *Myrmecocystus,* and of the new-world wasp genus *Polistes.*
Mr. Sphon	Studies on eastern Pacific Mitridae and opisthobranchs.
Dr. Stager	Systematics of the pan-tropical woodpecker genus *Picumnus* and of the birds of East Africa.
Dr. Swift	Systematics and ecology of southern California recent and fossil fishes; catalog of the type specimens of fossil southern California fishes; studies of certain eastern American cyprinid fishes; and on the utilization of estuarine fishes by southeastern American Indians.
Dr. Truxal	Mammalian ectoparasites of Costa Rica; the aquatic Hemiptera of Peru and Costa Rica; and the biology of selected notonectids.
Dr. Whistler	Late Tertiary stratigraphy and the vertebrate fauna of the Mojave Desert; climatic change and the evolution and biogeography in the Late Tertiary of the southwestern U.S.; the small vertebrates of the Miocene Vedder locality, Branch Canyon Formation, California.
Dr. Wilson	The coral fauna of the Permian McCloud Limestone.
Dr. Wright	Synopsis of the races of *Cnemidophorus inornatus,* with a computer-generated estimate of gene flow between populations; review of the Peruvian species of the lizard genera *Tropidurus* and *Dicrodon;* evolution and systematics of the lizard genus *Cnemidophorus;* chromosomes and evolution of the lizard family Anguidae and of the frog families Mycrohylidae and Ranidae; the reptiles and amphibians of East Africa.



McLean, James H.

1969. Marine shells of southern California. Science Series 24, Zoology no. 11, 104 pp.
1970. New species of Panamic marine gastropods. The Veliger, vol. 12, no. 3, pp. 310-315.
1970. Descriptions of a new genus and eight new species of eastern Pacific Fissurellidae, with notes on other species. The Veliger, vol. 12, no. 3, pp. 362-367.
1970. Notes on the deep water calliostomas of the Panamic province, with descriptions of six new species. The Veliger, vol. 12, no. 4, pp. 421-426.
1970. New species of tropical eastern Pacific Gastropoda. Malacological Review 2: pp. 115-130.
1970. Reinstatement of the turrid genus *Bellaspira* Conrad, 1868 (Mollusca: Gastropoda) with a review of the known species. L.A. Co. Mus. Nat. Hist. Contr. Sci. 189, pp. 1-11. (with L. H. Poorman)
1970. *Calotrophon*, a new world muricid genus (Gastropoda: Muricacea). The Veliger, vol. 13, no. 1, pp. 57-62. (with W. K. Emerson)
1970. New eastern Pacific subgenera of *Turbo* Linnaeus, 1758, and *Astraea* Roding, 1798. The Veliger, vol. 13, no. 1. pp. 71-72.
1970. On the authorship of Part V of Eschscholtz's "Zoologischer Atlas," 1833. The Veliger, vol. 13, no. 1, p. 112.
1971. Hybridization in the eastern Pacific abalones *(Haliotis).* Bull., L.A. Co. Mus. Nat. Hist., 37 pp. (with B. Owen and R. J. Meyer)

Mead, Giles W.

1970. Midwater Fishes from the Eastern South Pacific Ocean. Anton Bruun Report (Sci. Res. Southeast Pacific Exp.) no. 3, 46 pp. (with James E. Craddock)
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1970. Notes on the natural history of snipe eels. Proc. Calif. Acad. Sci., vol. 38, no. 5, pp. 99-103, 1 fig. (with S. A. Earle)
1971. Herring. *in* Encyclopaedia Brittanica, pp. 448-449. (with Geo. A. Rounsafell)

Patten, Donald R.

1970. Observations and records of *Myotis (Pizonyx) vivesi* Menegaux (Chiroptera: Vespertilionidae). L.A. Co. Mus. Nat. Hist. Contri. Sci. 183, pp. 1-9. (with Lloyd T. Findley)

Reiner, Burton A.

1969. America's Black Heritage. Editor for text for "The National Black Heritage" section. History Division Bulletin no. 5, 1969, pp. 9-37.

Rozaire, Charles E.

1970. "Appendix III: Analysis of Basketry from Site LAN-227." In King, C., T. Blackburn and E. Chandonet, the archaeological investigation of three sites on the Century Ranch, Western Los Angeles County, California. Archaeological Survey Annual Report, vol. 10, p. 131. Dept. of anthropology, UCLA.
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Snelling, Roy R.

1969. Notes on the systematics and dulosis of some western species of *Formica*, subgenus *Raptiformica*. Proc. Ent. Soc. Wash., 71: pp. 194-197.
1970. Studies on California ants. 5. Revisionary notes on some species of *Camponotus*, subgenus *Tanaemyrmex*. Proc. Ent. Soc. Wash., 72: pp. 390-397.
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1970. The *Hylaeus* of the Bonin Islands, Western Pacific Ocean. Bull. So. Calif. Acad. Sci., 69: pp. 1-19.
1970. Studies on North American bees of the genus *Hylaeus*. 5. The subgenera *Hylaeus*, s. str., and *Paraprosopis*. L.A. Co. Mus. Nat. Hist. Contr. Sci. 180: pp. 1-59.
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Sphon, Gale G.

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1971. New Opisthobranch records for the eastern Pacific. The Veliger, vol. 13, no. 4, pp. 368-369.
1971. Type specimens of recent mollusks in the Los Angeles County Museum of Natural History. L.A. Co. Mus. Nat. Hist. Contr. Sci. 213, pp. 1-37.

Swift, Camm C.

1970. A review of the eastern North American cyprinid fishes of the *Notropis texanus* species group (subgenus *Alburnops)*, with a definition of the subgenus *Hydrophlox*, and materials for a revision of the subgenus *Alburnops*. Diss. Abst. vol. 31b, no. 5: 3081.

Truxal, Fred S.

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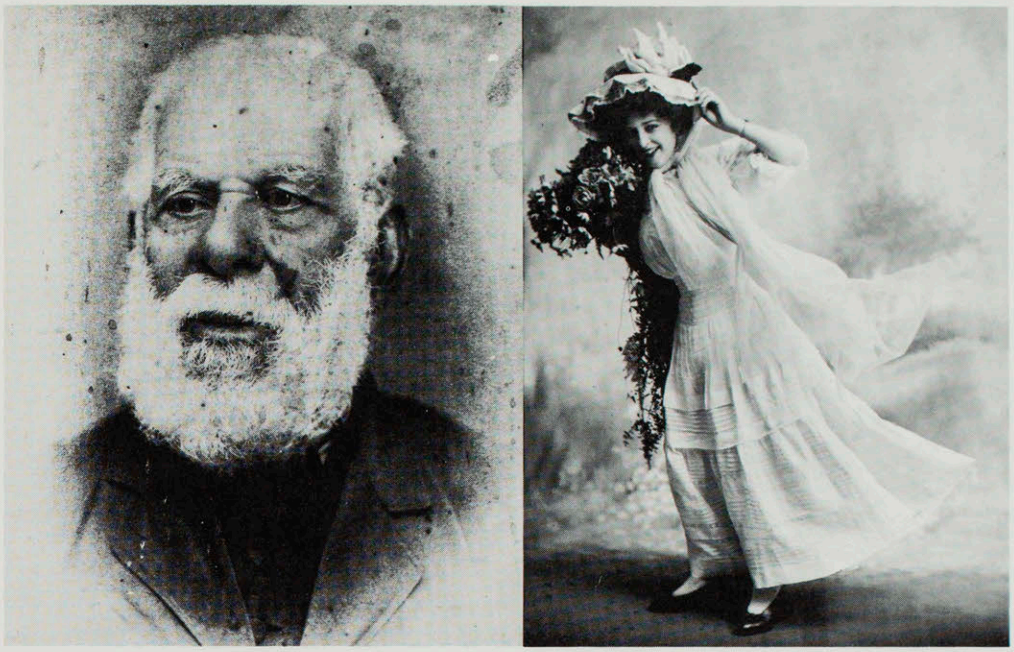

No. 194 Another new night lizard *(Xantusia)* from Durango, Mexico, by Robert G. Webb. 10 pp., 2 figs. July 1, 1970.
No. 195 The birds of the Kalinzu Forest, southwestern Ankole, Uganda, by Herbert Friedmann and John G. Williams. 27 pp., July 1, 1970.
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No. 197 The social wasps of Lower California, Mexico (Hymenoptera: Vespidae), by Roy R. Snelling. 20 pp., 4 figs. July 28, 1970.
No. 198 Additions to the known avifauna of the Bugoma, Kibale, and Impenetrable Forests, West Uganda, by Herbert Friedmann and John G. Williams. 20 pp. August 31, 1970.
No. 199 Fish remains, mostly otoliths and teeth, from the Palos Verdes Sand (late Pleistocene) of California, by John E. Fitch. 41 pp., 6 figs. November 13, 1970.
No. 200 A new species of *Batrachoseps* (slender salamander) from the desert of southern California, by Arden H. Brame, Jr. 11 pp., 5 figs. November 13, 1970.
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No. 202 The ethology of the wasp, *Pseudomasaris edwardsii* (Cresson), and a description of its immature forms (Hymenoptera: Vespoidea, Masaridae), by Philip F. Torchio. 32 pp., 33 figs. November 24, 1970.
No. 203 A review of the extinct avian genus, *Mancalla,* by Hildegarde Howard, 12 pp., 1 fig. November 24, 1970.
No. 204. A new moth fly of the genus *Psychoda* from crabholes on the Kenya coast (Diptera: Psychodidae), by Charles L. Hogue. 5 pp., 7 figs. November 24, 1970.
No. 205 Further information on the breeding biology of the honey guides, by Herbert Friedmann. 5 pp., November 24, 1970.
No. 206 The biology of *Anthophora (Micranthophora) peritomae* Cockerell, by Philip F. Torchio. 14 pp., 11 figs. January 5, 1971.
No. 207 Trombiculid mites of the genus *Microtrombicula (Acarina)* from Costa Rica, by James P. Webb, Jr. and Richard B. Loomis. 15 pp., 4 figs. February 4, 1971.
No. 208 The role of introgressive hybridization in the development of *Salvia:* section Audibertia (Labiatae), by William A. Emboden, Jr. 15 pp., 4 figs. February 4, 1971.
No. 209 Five new species of *Acmaeodera* (Coleoptera: Buprestidae) from the southwestern United States and Baja, California, by Richard L. Westcott. 19 pp., 15 figs. February 17, 1971.
No. 210 Observations on the biology of land crabs and their burrow associates on the Kenya coast, by Charles L. Hogue and Donald B. Bright. 10 pp., 5 figs. February 17, 1971.
No. 211 The birds of the lowlands of Bwamba, Toro Province, Uganda, by Herbert Friedmann and John G. Williams. 70 pp., April 7, 1971.
No. 212 Notes on the bat flies of Costa Rica (Diptera: Nycteribiidae), by B.V. Peterson. 8 pp., 2 figs. March 31, 1971.
No. 213 Type specimens of Recent mollusks in the Los Angeles County Museum of Natural History, by Gale Sphon. 37 pp., 2 figs. May 27, 1971.
No. 214. Studies on California ants. 6. Three new species of *Myrmecocystus* (Hymenoptera: Formicidae), by Roy R. Snelling. 16 pp., 2 figs. May 28, 1971.
No. 215 Status of certain frogs of the genus *Colostethus,* with descriptions of new species, by Philip A. Silverstone. 8 pp., 3 figs. June 9, 1971.

Bulletins

The Museum Bulletin series includes scientific contributions of monographic size and importance. Those published during the biennium:

No. 6 Ecological groups of deep-sea animals off southern California, by Alfred W. Ebeling, Richard M. Ibara, Robert J. Lavenberg, and F. James Rohlf. 43 pp., 9 figs. January 22, 1970.
No. 7 Development of lanternfishes (family Myctophidae) in the California current. Part I. Species with narrow-eyed larvae, by H. Geoffrey Moser and Elbert H. Ahlstrom. 145 pp., 53 figs. February 25, 1970.
No. 8 Review of the Miocene Wounded Knee faunas of southwestern South Dakota, by J. R. Macdonald. 82 pp., 32 figs., 2 geol. maps. June 30, 1970.
No. 9 Hybridization in the eastern Pacific abalones *(Haliotis),* by Buzz Owen, James H. McLean and Richard J. Meyer. 37 pp., 21 figs., 1 color plate. January 15, 1971.
No. 10 Pleistocene vertebrates of the Los Angeles basin and vicinity (exclusive of Rancho La Brea), by Wade E. Miller. 124 pp., 43 figs. February 17, 1971.
No. 11 The life history of a neotropical slider turtle, *Pseudemys scripta* (Schoepff), in Panama, by Edward O. Moll and John M. Legler. 102 pp., 56 figs., 22 tables. May 18, 1971.

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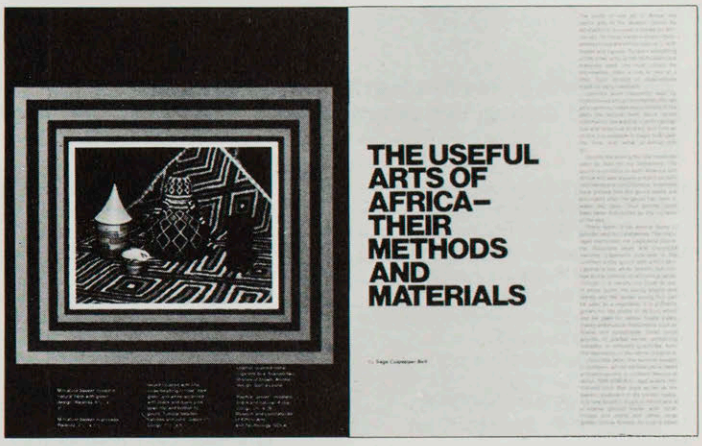
THE USEFUL
ARTS OF
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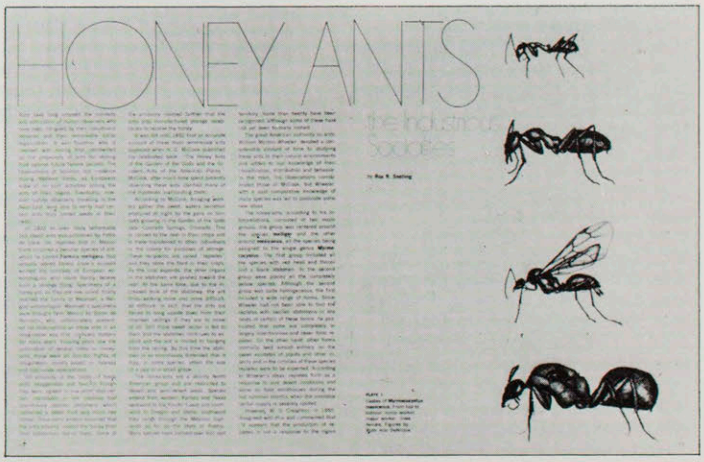
THEIR
METHODS
AND
MATERIALS


HONEY ANTS

SCHOOL TOUR PROGRAM 1969-1971

The Natural History Museum each school year accommodates over three thousand school classes comprising upwards of 110,000 students. This program of the Museum's Education Division schedules each of these classes into the gallery of its choice and provides a trained guide or Docent-guide to instruct the class in the hour allotted to it.

Instructional materials in a particular gallery are sent out to each teacher at the time a reservation is made so the teacher may prepare the class for its visit.

Actual figures for 1969-70 were 3,049 classes of 121,038 pupils: 1970-71 program toured 3,031 classes of 109,116 pupils.

Following is a list of the Public School Districts served and the number of classes from each district.

Los Angeles County Public School Districts

Total Number School Classes

ABC 60
Alhambra 13
Azusa 32
Baldwin Park 15
Bassett 83
Bellflower 106
Beverly Hills 89
Bonita Park 25
Burbank 117
Castaic Union 5
Centinela Valley 2
Charter Oak 23
Claremont 16
Compton 77
Covina Valley 44
Downey 7
Duarte 14
East Whittier 24
El Monte 69
El Rancho 6
El Segundo 27
Enterprise 35
Garvey 103
Glendale 14
Glendora 5
Hacienda La Puente 56
Hawthorne 14
Hermosa Beach 7
Inglewood 60
La Canada 9
La Puente 5
Las Virgenes 26
Lawndale 4
Lennox 14
Little Lake 118
Long Beach 45
Los Angeles 1,320
Los Nietos 91
Lowell Joint 43
Lynwood 36
Manhattan Beach 33
Monrovia 31
Montebello 49
Mountain View 16
Newhall 29
Norwalk-La Mirada 161
Palos Verdes 43
Paramount 52
Pasadena 52
Pomona 116
Redondo Beach 59
Rosemead 9
Rowland 12
San Gabriel 62
San Marino 2
Santa Monica 66
Saugus Union 27
South Bay Union 1
South Pasadena 2
South Whittier 19
Sulphur Springs 30
Temple City 2
Torrance 176
Valle Lindo 5
Walnut 44
West Covina 30
Whittier City 64
Willowbrook 5
Wiseburn 73

Colleges 71
Headstart 59
Private Schools 615

Out of County School Districts

Anaheim 67
Barstow 1
Beaumont 2
Brea-Olinda 2
Buena Park 24
Cambria 2
Centralia 6
Chino 3
Corona 6
Coronado 1
Costa Mesa 1
Cucamonga 1
Cypress 14
Desert Sands 6
Fontana 3
Fountain Valley 18
Fullerton 15
Garden Grove 30
Hemet 11
Hueneme 3
Huntington Beach 10
Jurupa 3
Kern 6
La Habra 26
Laguna Beach 7
Los Alamitos 14
Magnolia 7
Moreno Valley 7
Mojave 1
Newport Beach 1
Newport Mesa 11
Ocean View 6
Ojai 3
Ontario Montclair 10
Orange 42
Oxnard El. 8
Oxnard High 23
Placentia 18
Redlands 38
Rim of the World 2
Riverside 2
San Bernardino 2
San Joaquin 3
Santa Ana 9
Santa Barbara 4
Santa Paula 11
Savannah 3
Simi Valley 50
Taft 3
Tustin 15
Upland 6
Valley Oaks 3
Visalia 1
Ventura 6
Westminster 20
Yucaipa 4

Additional Tours 39

The Individual Schools Served in the Various Districts Were:

Los Angeles County Public School Districts

ABC
Aloha
Bloomfield
Elliott
Furgeson
Gahr Sr. High
Killingsworth Jr. High
Melbourne
Opportunity
Palms
Stowers
Tetzlaff Jr. High
Willow

ALHAMBRA
Brightwood
Fremont
Garfield
Marguerita
Northrup
Park
Pre-School
Ramona

ARCADIA
Arcadia Sr. High
Bonita Park
Camino Grove
Highland Oaks
Holly Ave.
Longley Way
Reid, Hugo
Santa Anita
Stocker, Baldwin

AZUSA
Center
Drendel
Ellington
Foothill Jr. High
Gladstone Sr. High
Lee
Magnolia
Murray
Paramount
Powell
Slauson Jr. High
Valley Dale

BALDWIN PARK
Baldwin Park
DeAnza, Juan
Geddes
Heath
Kenmore
Landis
Vineland
Washington
Walnut

BASSETT
Bassett El.
Bassett Sr. High
Erwin
Flanner
Julian, Don
Keenan
Ocean View
Sunkist
Tonopah
Van Wig

BELLFLOWER
Baxter, Albert
Bellflower Sr. High
Foster, Stephen
Jefferson
Lindstrom, Esther
Las Flores
Mann, Horace
Pyle, Ernie
Ramona
Rogers, Will
Ross, Betsy
Wilson, Woodrow
Woodruff, Frank

BEVERLY HILLS
Beverly Hills Sr. High
Beverly Vista
El Rodeo
Hawthorne
Mann, Horace

BONITA PARK
Allen Ave.
Ekstrand
La Verne Heights
Miller, Grace
Ramona Jr. High
Roynon

BURBANK
Burbank
Burbank Sr. High
Central
Disney
Edison
Emerson
Franklin
Geddes
Harte, Bret
Jefferson
Lincoln
Mann, Horace
McKinley
Miller
Monterey
Muir Jr. High
Providencia
Roosevelt
Stevenson
Washington

CASTAIC UNION
Castaic

CENTINELA VALLEY
Lawndale Sr. High
Lennox Sr. High

CHARTER OAK
Banna
Cedargrove
Charter Oak
Glen Oak
Ruddock
Washington
Willow

CLAREMONT
Claremont
Condit
Lincoln
Mountain View
Sumner
Vista Del Valle

COMPTON
Anderson
Bunche Jr. High
Bursch
Caldwell
California St.

LOS ANGELES

Adams Jr. High
Albion St.
Aldama
Allesandro
Alta Loma
Amestoy
Ambler
Anatola
Anchorage
Andasol
Annalee Ave.
Apperson St.
Arlington Heights
Arminta
Ascot
Atwater
Audubon Jr. High
Avalon Gardens
Baldwin Hills
Balboa Blvd.
Barton Hill
Beckford
Beechwood
Beachy Ave.
Beethoven
Bell Sr. High
Bellagio Rd.
Belmont Sr. High
Belvedere Jr. High
Bennett, M. E. (Deaf)
Berendo Jr. High
Blythe St.
Bonita St.
Boucher Jr. High
Braddock Dr.
Brainard Ave.
Breed St.
Brentwood
Bridge St.
Broadacres Ave.
Broadway
Brockton Ave.
Brooklyn
Budlong
Burbank Jr. High
Burnside
Bushnell
Cahuenga
Calabash
Calahan
Calvert
Camellia
Canfield Ave.
Cantara St.
Canterbury Ave.
Canyon
Capistrano
Caroldale Ave.
Carpenter
Carson St.
Carnegie Jr. High
Carthay
Carver Jr. High
Castle Heights
Castelar
Catskill Ave.
Century Park
Chapman
Charnock Rd.
Chase St.
Chatsworth Park
Cheremoya
Cienega
City Terrace
Clay, Henry
Clover Ave.
Coeur d'Alene
Cohasset
Coldwater Canyon
Collins St.
Commonwealth Ave.
Compton Ave.
Corona Ave.
Cortez St.
Corvallis Sr. High
Cowan Ave.
Crenshaw Sr. High
Crescent Heights
Crestwood St.
Dakota St.
Danube Ave.
Darby Ave.
Dayton Heights
Del Amo
Delevan Drive
Denker Ave.
Devonshire
Dixie Canyon
Dodson Jr. High
Dominguez
Dorris Place
Dublin Ave.
Drew Jr. High
Dyer St.
Eagle Rock
Eastman Ave.
Elizabeth St.
El Oro Way
Elysian Heights
Emelita St.
Emerson Manor
Eshelman Ave.
Euclid Ave.
Fairburn Ave.
Fairfax Sr. High
Fenton
Fern Angelus
Figueroa St.
Filmore
Fishburn Ave.
Fletcher Drive
Florence Ave.
Ford Blvd.
Franklin Ave.
Franklin Sr. High
Fullbright Ave.
Garden Sr. High
Garfield Sr. High
Gardner St.
Garvanza
Gates St.
Gates Jr. High
Gault
Germain St.
Glassell Park
Gledhill St.
Glenfeliz Blvd.
Glenwood
Gompers Jr. High
Graham
Granada
Grape St.
Gravois
Gridley St.
Griffin Ave.
Griffin Jr. High
Haddon Ave.
Hamilton Sr. High
Hammel St.
Hancock Park
Harbor City
Harding St.
Harrison
Hart St.
Hart Jr. High
Hawaiian Ave.
Haynes St.
Hazeltine Ave.
Heliotrope
Henry, Patrick Jr. High
Herrick Ave.
Hesby St.
Highlander Rd.
Hillside
Hobart Blvd.
Hollenbeck Jr. High
Holmes Ave. Child Care Ctr.
Hooper St.
Hoover St.
Hubbard St.
Huntington Dr.
Huntington Park Sr. High
Hyde Park
Imperial
Ivanhoe
Jefferson
Jordan Sr. High
Justice St.
Kennedy, Robert
Kenter Canyon
Kentwood
Kittridge St.
Knollwood
Lanai Rd.
Lane, Robert
Langdon Ave.
La Salle
Lassen
Latona Ave.
Leapwood Ave.
Leland St.
LeMay St.
Liggett St.
Limerick Ave.
Lincoln Jr. High
Lincoln Sr. High
Lockhurst
Lockwood Ave.
Logan St.
Loma Vista
Lomita
Loreto St.
Lorne St.
Los Angeles Sr. High
Magnolia Ave.
Main St.
Manchester Ave.
Manhattan Place
Mann Jr. High
Marianne Ave.
Markham Jr. High
Manual Arts Sr. High
Marlton (Deaf)
Marvin Ave.
Marquez
Mar Vista
Mayall
Mayberry St.
McBride (Handicapped)
McDonnell (TMR)
Meadow Oaks
Melrose Ave.
Menlo Ave.
Meyler St.
Micheltorena
Middleton St.
Miller, Loren
Miller Sr. High
Miramonte
Monlux, John
Monte Vista
Morningside
Mt. View
Mt. Washington
Murchison St.
Muir, John, Jr. High
Napa St.
Nestle Ave.
Nevada Ave.
Newcastle
Nightingale Jr. High
Noble Ave.
Normandie Child Care Ctr.
Normont
North Hollywood
Oakdale Ave.
Olive View Jr. High
O'Melveny
Osage Ave.
Osceola St.
Overland Ave.
Oxnard St.
Pacific Palisades
Pacoima Jr. High
Palmdale
Palms
Panorama
Park Village
Park Western Place
Parmelee

Last year alone, some 110,000 students were guided through our halls. Youngsters of all ages, kinds, colors and capacities received tours planned for their individual needs...

Loma Alta
Longfellow
McKinley
McKinley Jr. High
Pasadena Sr. High
Roosevelt (Handicapped)
Washington
Webster
Willard

POMONA
Alcott
Allison
Arroyo
Diamond Point
Ganesha
Golden Springs
Hamilton
Harrison St.
Kellogg
Kingsley
Lexington
Lincoln
Madison
Montvue
Mountain View
North San Antonio
Philadelphia
Roosevelt
San Jose
Simons Jr. High
Washington
Westmont
Yorba

REDONDO BEACH
Alta Vista
Andrews
Beryl Heights
Franklin
Jefferson
Lincoln
McCandless
Patterson
Van Gogh
Washington

ROSEMEAD
Janson
Shuey

ROWLAND
Blandford
Killian
La Seda
Northam
Rowland
Valinda

SAN GABRIEL
Coolidge
Jefferson
Madison
McKinley
Roosevelt
Washington
Wilson

SAN MARINO
Stoneman

SANTA MONICA
Cabrillo, Juan
Carver
Dale Jr. High
Edison
Franklin
Grant
Hillcrest
Madison
McKinley
Muir, John
Rogers, Will
Roosevelt
Santa Monica Sr. High
Washington
Webster

SAUGUS UNION
Canyon Sr. High
Cedarcreek
Emblem
Highland
Honby
Rio Vista
Skyblue Mesa

SOUTH BAY UNION
Redondo Beach Sr. High

SOUTH PASADENA
Monterey Hills

SOUTH WHITTIER
Lake Marie
Loma Vista
Los Altos
McKibben
Sunnyside
Telechron

SULPHUR SPRINGS
Mint Canyon
Mitchell
Soledad Canyon
Sulphur Springs

TEMPLE CITY
Longden

TORRANCE
Adams
Anza
Arlington
Arnold
Calle Mayor
Carr
Casimir
Crenshaw
Edison
Fern-Greenwood
Flavian
Hamilton
Hickory
Hillside
Jefferson
Levy
Lincoln
Madison
Madrona
Magruder
Meadow Park
Newton
North High
Parkway
Perry
Riviera
Seaside
Sepulveda
South High
Steele
Torrance
Towers
Victor
Walteria
Wood
Wright
Yukon

VALLE LINDO
Valle Lindo

WALNUT
Castle Rock
Valerio Sr. High
Walnut
Walnut Sr. High
Wilson

WEST COVINA
California
Coronado
Cortez
Edgewood Sr. High
Merced
Merlinda
Orangewood
Vine
Wescove
West Covina

WHITTIER CITY
Dexter Jr. High
Franklin
Jackson
Lincoln
Longfellow
Mill
North Whittier
Orange Grove
Phelan, Dan
Pioneer Sr. High
Sorenson
Washington
West Whittier

WILLOWBROOK
Carver
Willowbrook

WISEBURN
Anza
Burnett
Cabrillo
Dana Jr. High
Sepulveda
Smith, Don

COLLEGES
Bakersfield
Chaffey
Chapman
El Camino
Grossmont
Moorpark
Mt. San Antonio
Pasadena City
Pepperdine
Redlands
Sacramento State
Taft
University of California Los Angeles
University of Redlands
University of Southern California Medical Center
University of Southern California
University of Southern California—NCL Reading Ctr.
West Los Angeles

HEADSTART PROGRAMS
Bassett
Beverly Glen Co-op.
Child Care Center
Davis
Douglass, Frederick
Euclid Center
Follow Through
Glen Rose
Hamilton
Headstart Schools (Nine & Nine)
Hyde Park School Child Center
Kentwood
King, Martin Luther
Lincoln
Lomita
Los Angeles Pre-School
Los Ninos
Manchester
Mar Vista
Morningside Child Care
Nickerson Gardens
Parent Child Guidance
Parent Pre-School
Pasadena
Phillips
Pleasant Hills
Rio Hondo
Roosevelt
Toberman
Trinity
Urban League
Westchester Co-op
Zyniga

PRIVATE SCHOOLS
Acacia Baptist
All Saints Day
Alta Loma
Ascension Day
Ascension Lutheran
Assumption Redeemer
Bellflower S.D.A.
Berkeley Hall
Bethany Baptist
Bethel Christian
BIAS YAACOU
Braille Institute
Brethren Academy
Brethren El.
Brethren, Paramount
Brethren, Whittier
California Ed. Ctr.
Calvary Baptist
Chadwick
Chapel of Peace, Ingle.
Chemawa Jr. High

"Why are we forced to turn down increasingly large numbers of requests for school tours for the lack of Galleries?"

OUT OF COUNTY SCHOOL DISTRICTS

ANAHEIM
Anaheim
Barton, Clara
Dale Jr. High
Franklin, Benjamin
Henry, Patrick
Juarez, Benito
Jefferson
Lord Baden-Powell
(Wheel Chairs)
Madison Jr. High
Magnolia Sr. High
Palm Lane
Revere, Paul
Ross, Betsy
Savannah Sr. High
Sycamore Jr. High
Sunkist
Walker Jr. High
Western

BARSTOW
Barstow El.

BEAUMONT
San Andreas Sr. High

BREA-OLINDA
Mariposa

BUENA PARK
Beatty
Buena Park Sr. High
Cory
Emery
Gilbert
Lindbergh
Ramona Jr. High
Sullivan
Tracy

CAMBRIA
Cambria Adult School

CENTRALIA
Angelus Oaks
Centralia El.
Dysinger (Deaf)
Knott, Walter

CHINO
Chino El.
El Rancho

CORONA
Jefferson
Park Ridge

CORONADO
Coronado Sr. High

COSTA MESA
Pomona

CUCAMONGA
Cucamonga El.

CYPRESS
Arnold
Dickerson
King
Swain
Vessels

DESERT SANDS
Arvin Sr. High
Hoover, Herbert

FONTANA
Redwood

FOUNTAIN VALLEY
Bushard
Cox
Fountain Valley El.
Gisler
Harper
McDowell
Nieblas
Wardlow

FULLERTON
Acacia
Fullerton Sr. High
Golden Hill
Maple
Valencia Park

GARDEN GROVE
Bell Jr. High
Cabrillo
Cook
Crosby
Garden Grove El.
Excelsior
Fremont
Heritage
Los Amigos Sr. High
Mitchell
Santiago
Sunnyside
Violette
Zeyen

HEMET
Hemet Sr. High
Idyllwild El.
Little Lake
Ramona

HUNTINGTON BEACH
Laurel
Lebard
Peterson, John

HUENEME
Hathaway
Hueneme Sr. High
Park View

JURUPA
Rubidoux Sr. High

KERN
Arvin Sr. High

LA HABRA
Arboleta
La Habra Sr. High
Ladera Palma
Las Lomas
Las Positas
Sierra Vista
Tierra Rica
Valencia

LAGUNA BEACH
Aliso
Laguna Beach Sr. High

LOS ALAMITOS
Hopkinson
Jefferson
Lee

MAGNOLIA
Lord Baden-Powell
Maxwell

MORENO VALLEY
Moreno El.
Sunnyside

MOJAVE
Mojave Sr. High

NEWPORT BEACH
Newport El.

NEWPORT MESA
Corona del Mar
Estancia Sr. High
Harbor View
Mesa Verde
Middle Jr. High
Whittier El.

OCEAN VIEW
College View
Park View
Spring View

OJAI
Miramonte

ONTARIO MONTCLAIR
Anza Jr. High
Central
Edison
Euclid
Montclair C.S.F.
Monte Vista
Ontario Montclair El.

ORANGE
Cambridge
Dickerson
Esplanade
Fair Haven
Fletcher
Irvine
Lampson
Marine View
Mission Viejo Sr. High
Olive
Orange County Juv. Hall
Palmyra
Prospect
Silverado
Sycamore
Villa Park
West Orange

OXNARD ELEM.
Oxnard El.
Ramona
Rose Ave.

OXNARD HIGH
Camarillo Sr. High
Camarillo C.S.F.
Channel Island Sr. High
Juanita
Rio Mesa Sr. High

PLACENTIA
El Dorado Sr. High
Orchard
Sierra Vista
Valencia Sr. High
Van Buren
Wagner

REDLANDS
Bloomfield
Cram
Kimberly
Lincoln
Lugonia
Mentone
Miller, Grace
Redlands
Continuation Schl.
Smiley

RIM OF THE WORLD
Crest Forest

RIVERSIDE
Ramona

SAN BERNARDINO
Mt. Vernon

SAN JOACHIM
El Toro

SANTA ANA
Edison
Santa Ana El.
Santa Ana Sr. High

SANTA BARBARA
Santa Barbara El.
Viejo Valley

SANTA PAULA
Blanchard
Webster, Barbara

SAVANNAH
Hanson
Holder

SIMI VALLEY
Arcane
Arroyo
Berylwood
Big Springs
Brookside
Crestview
Katherine
Knolls
Mt. View
Park View
Simi Valley Sr. High
Sycamore
Township

TAFT
Taft Sr. High

TUSTIN
Beswick
Del Norte
Foss, Gwen
Tustin Jr. High
Tustin Memorial
Wallace

UPLAND
Foothill Knolls
Upland

VALLEY OAKS
Conejo

VISALIA
Liberty

VENTURA
Arnaz
El Rincon
Montalvo
Nordhoff Sr. High

WESTMINSTER
Anderson
Clegg, Ada
Cook, Clara
Finley
Golden West
Land, John F.
Sequoia
Schmitt
Seventeenth
Westminster El.

YUCAIPA
Yucaipa El.

ADDITIONAL TOURS
Adult Recreation Center
Alvino Heights
Avon School TMR
Bon View
Campfire Girls
Eagle Mt. Sr. High
Educational Guidance
Fanning
Golden Valley Sr. High
Harbor General Aphasic
Hull School
La Questa Continuation High
Ladera Linda
Locke Sr. High
Long Beach General Hospital
Los Padrinos Juvenile Hall, Downey
March Air Force Base School
Mexico City Sr. High
Montebello Adult School
Monterey Highlands
Panorama Arroyo Unified
Panorama Recreation Center
Sandburgh Jr. High
Thousand Oaks
West Valley Educational Center
White Memorial Hospital
WIN Pacoima
WIN Program
Youth Opportunity, Los Angeles

LENDING SERVICE

Sabre-tooth cat skulls, ancient firearms, birds up to the size of an eagle, small animals up to the size of a coyote, models of historic buildings, Indian implements, colored slides in the fields of science and history, maps, pictures. These are some of the items that may be borrowed from the Museum through its Education Division Lending Service. County residents buy a lending card for $3.00 and may keep items for two weeks. Most of the borrowers are teachers who come in on their own time to browse. However, twenty-four school districts in the County rent units of three hundred articles each and keep them centrally for their teachers' use.

The Lending Service in the school year 1970-71 was used by 1,066 different individuals from 432 schools and organizations on 3,058 different occasions. *This marks a rise in usage of approximately 35% over the previous 1969-70 school year.* Annual library cards sales were also up this same percentage. Approximately 14% of the schools are either junior high or high schools or private school and another 6% are private organizations. This means that 75% of the schools using the Lending Service are primary schools.

The following list comprises the specific schools and organizations that utilized the Lending Service in the last year.

E.S.—Elementary School
J.H.S.—Junior High School
H.S.—High School

Adventist Union School
Alexandria E.S.
Alemany H.S.
Allesandra E.S.
Alta Loma E.S.
Amestoy E.S.
Anchorage E.S.
Anderson E.S.
Angeles Mesa E.S.
Annalee Ave. E.S.
Apperson St. E.S.
Arlington Heights E.S.
Ascot Ave. E.S.
Atwater E.S.
Baldwin Hills E.S.
Bancroft E.S.
Banning Adult School
Barranca E.S.
Bassett St. E.S.
Bayview E.S.
Beckford E.S.
Beethoven E.S.
Bellagio Road E.S.
Bell Air E.S.
Bella Vista E.S.
Bellvedere E.S.
Bennett E.S.
Berkeley Hall School
Beverly Hills H.S.
Beverly Vista E.S.
Bertrand Ave. E.S.
Birmingham H.S.
Bloomingham E.S.
Bonita E.S.
Braddock Dr. E.S.
Brentwood E.S.
Brightwood E.S.
Broadacres Ave. E.S.
Broad Ave. E.S.
Brockton Ave. E.S.
Brooklyn Ave. E.S.
Brookside Ave. E.S.
Buchannan St. E.S.
Budlong E.S.
Bunch E.S.
Burrough H.S.
Bursch E.S.
Bushnell E.S.
Cabrillo E.S.
Canfield Ave. E.S.
Canyon E.S.
Carpenter Ave. E.S.
Carson E.S.
Carthay Center E.S.
Castelar E.S.
Castle Heights E.S.
Center Park E.S.
Centinella Valley E.S.
Century Park E.S.
Chandler Ave. E.S.
Childs World School
Cheremoya E.S.
Cienega E.S.
City Terrace E.S.
Clay J.H.S.
Clover Avenue E.S.
Cochran Ave. Baptist School
Colfax Ave. E.S.
Collier St. E.S.
Commonwealth Ave. E.S.
Compton E.S.
Cortez St. E.S.
Cowan Ave. E.S.
Crenshaw H.S.
Crescent Heights E.S.
Dacotah St. E.S.
Davis J.H.S.
Dayton Heights E.S.
Delevan Dr. E.S.
Denker Ave. E.S.
Dexter E.S.
Dominguez E.S.
Dorsey H.S.
Dove Day E.S.
Downey H.S.
Dublin Ave. E.S.
Eagle Rock E.S.
Eastman Ave. E.S.
Eastside Union E.S.
Edison E.S.
El Camino Real H.S.
Eliz St. E.S.
El Marino E.S.
El Monte E.S.
El Monte H.S.
El Rancho E.S.
El Segundo E.S.
El Segundo H.S.
Elysian Heights E.S.
Euclid Ave. E.S.
Evergreen Ave. E.S.
Fairburn E.S.
Fairfax H.S.
Farmdale E.S.
Ferangeles E.S.
Figueroa St. E.S.
Filmore E.S.
Fletcher Dr. E.S.
Florence E.S.
Ford Blvd. E.S.
Foshay J.H.S.
Franklin Ave. E.S.
Fremont E.S.
Frost J.H.S.
Gidley E.S.
Glassell Park E.S.
Glendale Academy
Glendora H.S.
Glenn H.S.
Goddard J.H.S.
Good Council School
Graham E.S.
Granada Hills Nursery School
Grant E.S.
Greenwood E.S.
Griffin Ave. E.S.
Hamilton H.S.
Hamilton Methodist Church School
Hammal St. E.S.
Hancock Park E.S.
Harbor Nursery School
Harte J.H.S.
Hawaiian Ave. E.S.
Hawthorne E.S.
Haynes St. E.S.
Heliotrope E.S.
Herrick St. E.S.
Highlands E.S.
Hillarouc E.S.
Hillcrest Drive E.S.
Hillside E.S.
Hobart Ave. E.S.
Holmes Ave. E.S.
Holy Nativity E.S.
Holy Trinity E.S.
Hoover St. E.S.
Howe E.S.
Hudnell H.S.
Humphreys Ave. E.S.
Huntington Dr. E.S.
Huntington Park E.S.
Hyde Park E.S.
Inglewood H.S.
Ivanhoe E.S.
Jorden Community Adult School
Kennedy E.S.
Kenwood E.S.
Keppel E.S.
Kester Ave. E.S.
Kranz J.H.S.
La Canada H.S.
La Cresta E.S.
Ladera E.S.
Lanai Road E.S.
Lark Ellen E.S.
La Salle Ave. E.S.
Las Candalistas E.S.
Lasseen E.S.
Lawndale E.S.
Lee E.S.
Lennow Pre-School
Leuzinger H.S.
Lillian St. E.S.
Lincoln J.H.S.
Lindbergh E.S.
Locke H.S.
Lokrantz E.S.
Loma Vista E.S.
Long Beach Polytechnic H.S.
Longfellow E.S.
Lorena St. E.S.
Loreta E.S.
Los Alamitos E.S.
Los Angeles County Special Schools
Los Angeles H.S.
Los Angeles Public Library
Lowmais E.S.
1st Luthern Church School
Madison J.H.S.
Main St. E.S.
Malabar St. E.S.
Manchester Ave. E.S.
Manhattan Place E.S.
Marianna Ave. E.S.
Markham J.H.S.
Marlton J.H.S.
Marquez Ave. E.S.
Marshall H.S.
Marvin Ave. E.S.
Mar Vista E.S.
Mayall St. E.S.
Mayberry St. E.S.
McKinnley Ave. E.S.
Melrose Ave. E.S.
Menlo Ave. E.S.
Meridian Childcare Center
Meyler St. E.S.
Micheltorena St. E.S.
Middleton E.S.
Miles Ave. E.S.
Miller E.S.
Miramonte E.S.
Mitchell E.S.
Monroe H.S.
Montebello J.H.S.
Monterey E.S.
Montesori Schools
Morningside H.S.
Mt. Carmel H.S.
Mt. View E.S.
Muir H.S.
Murphy H.S.
Nestle Ave. E.S.
Nevada Ave. E.S.
Newin Ave. E.S.
Newland E.S.
Normandie Ave. E.S.
Norwood St. E.S.
Oakmont E.S.
Oak St. E.S.
Oakwood E.S.
Oralingua E.S.
Orr E.S.
Our Mother of Good Counsel School
Overland Ave. E.S.
Oxnard St. E.S.
Pacific Boulevard E.S.
Pacific Palisades E.S.
Pacoima E.S.
Pacoima J.H.S.
Palms J.H.S.
Park E.S.
Parkman J.H.S.
Parmalee Ave E.S.
Paseo Del Fey E.S.
Payne E.S.
Pedragal E.S.
Pilgrim Day School
Pinewood E.S.
Pioneer E.S.
Plainview Ave. E.S.
Playa del Rey E.S.
Plummer E.S.
Point Dume E.S.
Point Vicente E.S.
Pomona E.S.
Quartz Hills H.S.
Queen Anne Place E.S.
Ranchito E.S.
Rancho E.S.
Rancho Vista E.S.
Raymond Ave. E.S.
Redeemer Luthern School
N. Redondo Chapel School
Richland Ave. E.S.
Richmond St. E.S.
Rinaldi St. E.S.
Rio Vista E.S.
Ritter E.S.
Riverside Dr. E.S.
Roosevelt H.S.
Roosevelt J.H.S.
Roscomere E.S.
Rosemont E.S.
Rosewood Ave. E.S.
Russell E.S.
St. Anthony's School
St. Augustine-by-the-Sea School
St. Elizabeth School
St. Frances X. Cabrini School
St. John Chrysostom School
St. Mathews H.S.
St. Paul of the Apostle School
St. Paul's Luthern School
St. Robert's School
St. Thomas School
San Fernando E.S.
San Gabriel Church School
San Pedro St. E.S.
Santa Barbara Ave. E.S.
Saticoy St. E.S.
Saugus E.S.
Shenandoah E.S.
Sheridan St. E.S.
Sherwood Oaks H.S.
Shinley E.S.
Shirpser E.S.
Short Ave. E.S.
Sierra Park E.S.
Silver Spur E.S.
Sirva E.S.
Soleado E.S.
Soto St. E.S.
South Park. E.S.
Southwest School for the Deaf
Stanford Ave. E.S.
Sterry E.S.
Sulphur Springs E.S.
Sunset E.S.
Sylvan Park E.S.
Taper Ave. E.S.
Tarzana Ave. E.S.
Towne Ave. E.S.
Trinity Luthern E.S.
Trinity St. E.S.
University S.D.A. School
Utah St. E.S.
United Methodist Church School
Valley View J.H.S.
Van Ness E.S.
Venice H.S.
Vermont Ave. E.S.
Vernon City E.S.
Victor E.S.
Vineland E.S.
Vine St. E.S.
Wadsworth Ave. E.S.
Walnut School
Warner Ave. E.S.
Weigand Ave. E.S.
West Athens E.S.
West Culver City Baptist Church School
Western Ave. E.S.
Westland E.S.
Westminster E.S.
Westport Heights E.S.
West Torrance E.S.
West Vernon E.S.
Westwood E.S.
Whittier E.S.
Whittier City E.S.
Wilbur Ave. E.S.
Wilkerson E.S.
Willard E.S.
Wilmington Park E.S.
Wilshire Crest E.S.
Wilson E.S.
Wilson H.S.
Windsor H.S.
Windsor Hills E.S.
Winter Gardens E.S.
Wonderland Nursery School
Woodcrest E.S.
Woodworth E.S.
Yerba Buena E.S.
Yorkdale E.S.

Numbered Schools
2nd St. E.S.
3rd St. E.S.
4th St. E.S.
6th St. E.S.
10th St. E.S.
11th St. E.S.
20th St. E.S.
24th St. E.S.
28th St. E.S.
32nd St. E.S.
36th St. E.S.
37th St. E.S.
East 45th St. E.S.
49th St. E.S.
52nd St. E.S.
54th St. E.S.
59th St. E.S.
61st St. E.S.
66th St. E.S.
68th St. E.S.
74th St. E.S.
93rd St. E.S.
95th St. E.S.
97th St. E.S.
99th St. E.S.
109th St. E.S.
111th St. E.S.
112th St. E.S.
118th St. E.S.
122nd St. E.S.
186th St. E.S.

Colleges and Universities
California Polytechnic
CSC Dominguez Hills
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CSC Long Beach
CSC Los Angeles
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Cypress J.C.
East Los Angeles City College
East Whittier C.C.
El Camino J.S.
Immaculate Heart College
Los Angeles Southwest College
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Mount St. Mary's College
Otis Art Institute
Occidental College
Pepperdine College
Rio Hondo College
San Fernando Valley State College
Santa Monica College
U.C.L.A.
U.S.C.
Whittier College

Private Organizations
ABC Headstart
American Broadcasting Company
Boy Scouts
Barnsdell Art Center
Benznger Association
California State Museum of Science and Industry
Campfire Girls
Center of Early Education
Cub Scouts
Dept. of Water & Power
Dubnoff School of Educational Therapy
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Gifted Children of E.L.A.
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Southwest School for the Deaf
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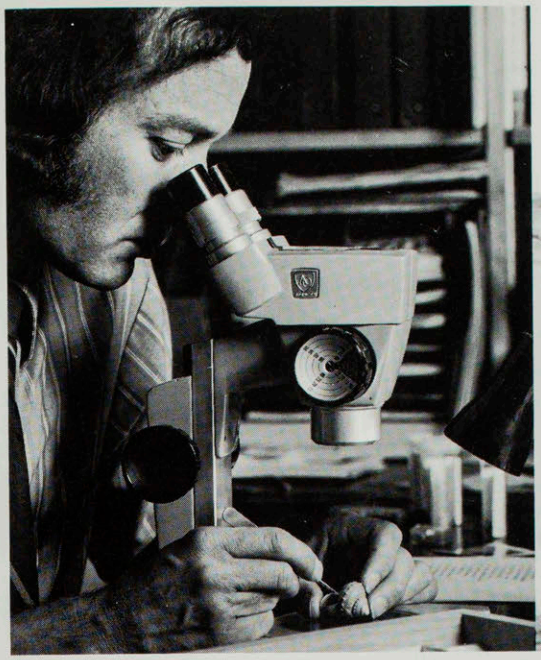
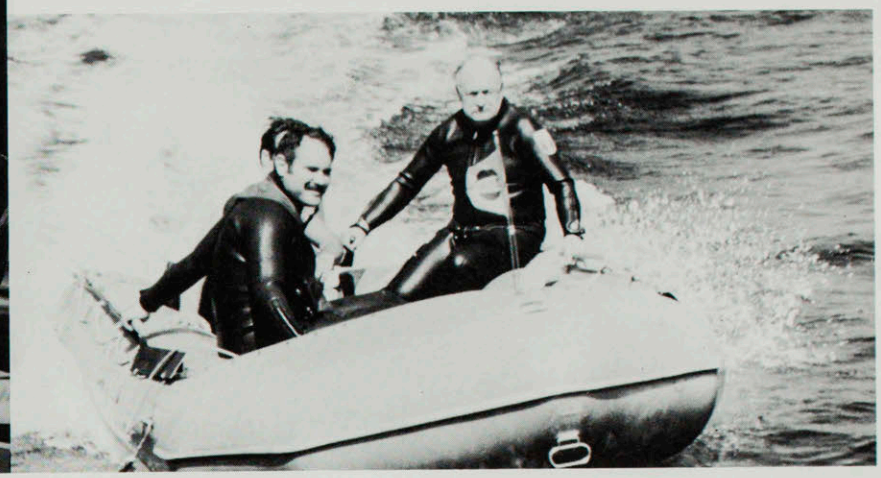
District Units—1971-72*
ABC Unified School District (1 unit)
Alhambra Unified School District (1 unit)
Arcadia Unified School District (1 unit)
Baldwin Park Unified School District (1 unit)
Compton & Enterprise School District (1 unit)
Culver City Unified School District (1 unit)
East Whittier City School District (1 unit)
Fullerton Unified School District (2 units)
Hawthorne Unified School District (1 unit)
Hacienda—La Puente School District (1 unit)
Inglewood School Unified School (1 unit)
Lancaster Unified School District (1 unit)
Los Nietos School District (1 unit)
Lowell Joint School District (1 unit)
Manhattan Beach Unified School District (1 unit)
Montebello Unified School District (1 unit)
Norwalk—La Mirada Unified School District (1½ units)
Pomona Unified School District (1 unit)
Redondo Beach School District (1 unit)
Rowland Unified School District (1 unit)
Saugus Union School District (1 unit)
West Covina Unified School District (1 unit)

*One returned unit from 1970-71 that is catalogued and ready to go!





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We are pleased with accomplishments but disheartened by our inability to keep pace with need. The citizen of this community deserves a Museum of Natural History at least as good as that provided the citizen of New York or Chicago. He doesn't have it; not yet.

Editorial Assistant: Dixie Myers
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Armando Solis
Charles Hogue
Cover: Ann Howe

THE GOLDEN STAFF

by **Charles E. Rozaire**

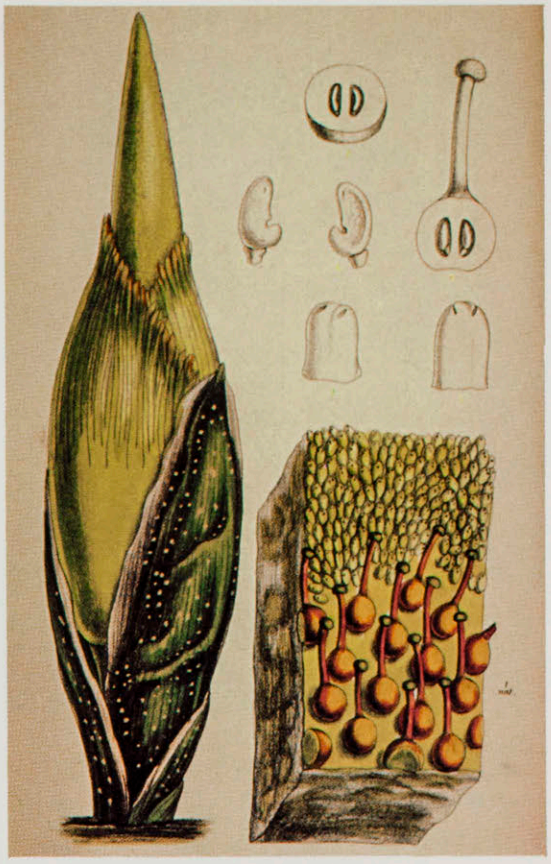
A stated goal of the Natural History Museum Alliance is to "help build a bigger and better museum of world stature for our community and the entire West." The museum, particularly the Archeology section, feels that the Alliance recently took a significant step in that direction by acquiring for the museum, a magnificent pre-Columbian gold staff from Peru which is to be placed on permanent exhibit in the HALL OF PRE-COLUMBIAN ARCHEOLOGY.

Gold staffs or scepters were carried by ancient American rulers as symbols of their authority. Inca legends tell of the divine power of gold, its symbol of superiority and its importance ordained by heavenly will. One story relates of a wooden stave being turned to gold and used as a protective device against the forces of evil and destruction. A gold scepter was an imperial symbol of the Inca. Our staff comes from the Trujillo area of the north coast of Peru and is attributed to the Chimu culture (which immediately preceded the Inca), dating from ca. A.D. 1100 to A.D. 1400. Basically it can best be described as a wooden core completely enclosed by hammered gold. A note of interest: The gold is held in place by small copper nails which have altered to cuprite and malachite. The staff is tapered, approximately 57 inches long and enhanced by a simple 5-lobed design at the top.

Prehistoric objects of gold provide much insight into the ancient cultures of America. The mere presence of worked gold attests to the technological and scientific knowledge of metal working and the objects produced obviate the craftsmen's skills and artistic achievements. Gold artifacts also provide insights into the deep spiritual values of our early Americans as well as direct evidence of the nature and extent of personal adornment and architectural accomplishments.

The acquisition of the Chimu staff provides the museum with an opportunity to focus the attention of its many friends on this most important facet of pre-Columbian craftsmanship and our intention to expand our holdings of objects of the precious metal, gold. An attempt to build a representative collection encompassing more than 2300 years of the art of the ancient American goldsmith will indeed be difficult but challenging and above all, rewarding! It is our intention to seek out those items representing the earliest known goldsmiths, the Chavín cultural horizon of Peru, to the relatively recent master craftsmen of Aztec Mexico. The museum already has a good nucleus on which to build — the Guggenheim and Clifford collections, the Tairona pendant, the Chimu staff. It is our belief that a representative collection of both quality of craftsmanship and significance of purpose, exemplifying the technological perfection and spiritual values of the ancient American Indian will provide a new appreciation of the great cultural heritage of this hemisphere.

Rafflesia arnoldi — world's largest flower

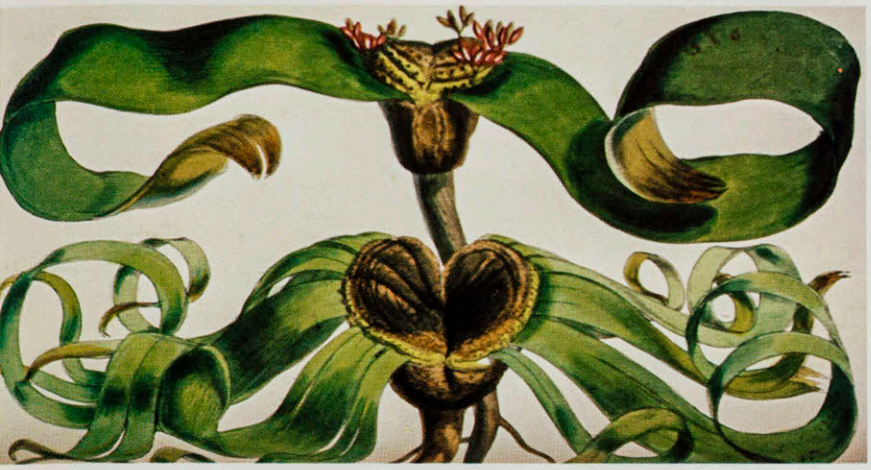


Amorphophallus titanum — young shoot emerging from corm

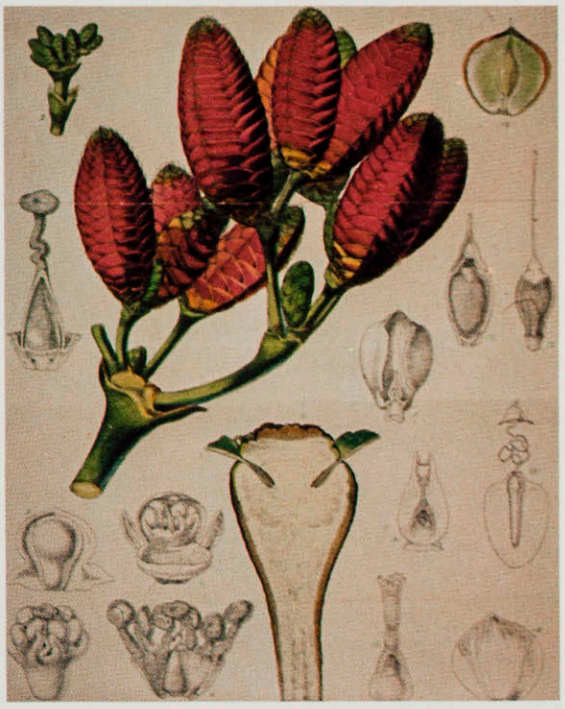
In August of 1878 an illustrious botanist and world renowed traveler, Dr. Beccari, wrote to his friend and patron the Marchese Corsi Salviati of a "pianta maravigliosa" which he discovered in the Padang Province of Sumatra. There is no doubt that the Marchese was impressed with the description which followed. "The single flower (or more correctly inflorescence) with the tuber (from which it springs almost directly), form together so ponderous a mass, that for the purpose of transporting it, it had to be lashed to a long pole, the ends of which were placed on the shoulders of two men. To give an idea of the size of this gigantic flower, it is enough to say that a man standing upright can barely reach the top of the flower, and that with open arms he can scarcely reach the top of the spadix with his hand, which occupies the center of the flower, and that with open arms he can scarcely reach halfway round the circumference of the funnel shaped spathe from the bottom of which the spadix arises." In the following year an Italian botanist Signor Arcangeli published a full botanical description of the giant aroid from his friend's communications and included an engraved plate drawn from a sketch made by Beccari. It is not without a smile that the reader of the Journal of the Botanical Society of Italy (vol. xi, p. 217, 1879) encounters the entry "L'Amorphophallus Titanum, Beccari, illustrato di G. Arcangeli." The Archangel of Botany had a rather erotically oriented sense of humor in christening this plant which, I might hasten to add, is in full accord with its morphology.

The Marchese Corsi Salviati was the fortunate recipient of seeds of this giant plant, some of which germinated in a garden in Sesto, where some were subsequently sent to the Botanical Conservatory in Florence. A few young plants were shipped to the Kew Garden Conservatory in London at the request of Dr. Beccari in 1879. Fortunately his letter to the Marchese had included a detailed description of the habitat of the plant collected at Ajer Manticior on the west coast of Sumatra, " . . . the atmosphere is perennially humid; the mean highest and lowest temperatures at the former locality are 25° and 32° centigrade (77°-89° Fahrenheit). The plant courts a deep shade, and a light soil." In addition to this note on the habitat, the gardeners at Kew had the notes of the naturalist Forbes, who was at this time the only other European to have seen *Amorphophallus* in its native habitat. In his *Naturalist's Wanderings in the Eastern Archipelago,* Forbes writes of encountering an *Amorphophallus,* or "Grubi" as the Sumatrans call it, growing on the King River in the Barisan range. This specimen measured seventeen feet in height and the stem at the base being two feet seven inches in circumference. The gigantic corm from which it arose was six feet six inches in circumference, "the whole being a load for twelve men."

One of the seedlings received from the Marchese by Sir Joseph Hooker, then head of Kew, was cultivated for a ten-year period in the house where the *Victoria regia* was grown, where in June of 1887 it threw its first bloom. The spadix enshrouded in a mottled green spathe pushed up from a leafless tuber in the loamy soil and grew at a fantastic rate. In a few days the mottled mantle unwound and the pale spadix appeared, a ghost-like sentinel erect within the ruffled sheath which revealed a maroon-violet colored interior. The monstrous flower lasted but a day, emitting a stench which "was very powerful, and suggested a mix-



Welwitschia mirabilis — grotesque plant of the west African plains



Welwitschia mirabilis — close up of the cones or flowers

ground of pale green.

Visitors other than scientists and reporter-photographers were so numerous that they had to file by the greenhouse and view the "beast" through the glass panes. Had they been allowed into the house the aforementioned stench might have made many quite ill. With the ventilators open it was still possible to smell the fetid bloom without succumbing to the nauseous odor. Some returned several times to see the gradual contorting of the spathe into an urn and witness the ultimate collapse of both the spadix and spathe. Unlike the Kew *Amorphophallus* which lasted only a few hours, the New York Botanical Garden had the flower open for almost four days. On June 12 the ultimate collapse brought an end to the spectacle that had created more attention than the opening of the opera season. The New York Herald Tribune had reported on the development each day from inception of inflorescence to the flaccid finale. On June 29 the tuber was taken from the tub and washed; it then weighed 113½ pounds. As it had started to rot, it was divided into pieces with adventitious buds and numerous new plants were thus obtained.

Other botanical gardens have brought *Amorphophallus titanum* into flower, but none has surpassed the New York specimen in size. A specimen in Java's Buitenzork Botanical Gardens was depicted in the Gardeners Chronicle for November of 1924 with a Javanese boy standing next to it. The boy was less than two thirds the height of the plant, but Javanese boys are small, and the actual measurements reveal the plant to have been six feet from soil to spadix tip, whereas the New York specimen attained a maximum height of eight feet five inches. New Yorkers were not unusual in their enthusiastic response to the monster, for in Hamburg, Germany, a similar flowering created such a sensation as to require a cordon of police outside of the conservatory to keep the crowds under control as they waited to glimpse the giant in the conservatory.

Fortunately Dr. Beccari was a capable artist and drew the plant as he had seen it in Sumatra, equally fortunate was the fact that he had the Marchese Corsi Salviati as a patron, for the Marchese commissioned the drawing and painting of two Sumatrans carrying a flower strapped to a pole as a leaf towers nearby. Remarkably the painting measures eighteen feet by fifteen feet and was presented to the director of Kew Gardens in 1881. It ultimately found repose on the ceiling of the Hall of Timbers where it remains as a testimony to the most astonishing member of the plant kingdom.

Amorphophallus titanum surpasses other members of the plant world not only in the size of the inflorescence, but in the rate of growth (the amount of tissue development per unit time). It is not however the world's largest flower, but a collection of flowers simulating one gigantic flower. The prize for gigantism in a single flower goes to a plant which is in immediate geographical proximity to the *Amorphophallus,* it is the parasite *Rafflesia arnoldi.* This monarch grows on the root of a vine *Tetrastigma* (and *Vitis* sp.) and is unique in that it has no vegetative parts, but consists of a single fleshy flower the size of a washtub (often 3 feet in diameter). The petals of the plant are almost an inch in thickness and are of a deep flesh color flecked with cream colored patches. The nectary is an enormous bowl which when filled with water will hold six quarts. Projecting upward from the basin floor are the flowers which together look like spikes in a medieval

mentioned genera.

One such plant was raised in the stovehouses at Kew in 1847 from seeds brought from Jamaica and was noted to be the largest flower in the world next to *Rafflesia.* The flower being measured from base to apex. One of the colorful names given to the flower is "Poison Hog-meat," for, according to Dr. Lunan who worked on this species, "... the plant is so abominably fetid that it is detested and shunned by most animals, yet when hogs venture, through necessity, to eat of it, it destroys them." Likewise, Dr. Tussac wrote in his *Flora des Antilles* that a whole herd of swine having been driven into the woods, where *Aristolochia grandiflora* was common, had entirely perished from eating the roots and young stems." It would seem that in this case, the plant is every bit as noxious as its scent and sinister appearance.

Welwitschia has a form so grotesque that it might have been conceived by the pen of Aubrey Beardsley. Dr. Frederic Welwitsch while exploring the elevated sandy plateau near Cape Negro, western Tropical Africa, found this plant growing on a plain which was permeated with ruts through which water ran during rainy seasons. In this open area were to be seen the bizarre plant figured in the text. The apex of the trunks measured six feet across and the long strap-like leaves extended, in art nouveau curves, a distance of three fathoms (or 18 feet)! An artist by the name of Thomas Baines accompanied the expedition and made drawings which, when published as engraved plates, excited European botanists, "an interest which had never been exceeded, if equalled, since the discovery of *Rafflesia."* Dr. Hooker proposed that the plant be named *Welwitschia mirabilis* after its discoverer. Attempts to cultivate seed and living specimens was at first abortive, but subsequently flowering specimens have been achieved. The plant has a long tap root, sometimes exceeding three feet in depth allowing it to survive the very arid seasons. It is also worthy of note that the plant exudes a gum from all of its parts. When the description was finally published in the *Transactions of the Linnaean Society,* it read in part: "It is a woody plant, said to attain a century in duration, with obconic trunk about two feet long, of which a few inches only rise above the soil, presenting the appearance of a flat two-lobed depressed mass, sometimes, according to Dr. Welwitsch attaining 14 feet in circumference, and looking like a round table. When full grown, it is dark-brown, hard and cracked over the whole surface, much like the burnt crust of a loaf of bread: the lower portion forms a stout taproot, buried in the soil, and branching downwards at the end. From deep grooves in the circumference of the depressed mass, two enormous leaves are given off, each six feet long (and probably much more) when full grown, one corresponding to each lobe of the trunk: these are quite flat, linear, very leathery, and split to the base into innumerable thongs, that lie curling upon the surface of the soil. "... From the circumference of the tubular mass above, but close to the insertion of the leaves, spring stout, dichotomously branched cymes, nearly a foot high, bearing small erect scarlet cones ... and these contain, when young, small, solitary flowers which in some cones are hermaphroditic in others female." The closest relative of this anomaly is *Ephedra* which grows on southern California deserts.

A plant so noble as to have been named in honor of Queen Victoria and so extravagant as to have been made the subject of two folio size volumes is the gigantic water lily, *Victoria regia.* The reaction in Holland at the Van Houtte Gardens was to construct an entire conservatory, a splendid Victorian Dome, to properly house the rarity. It was on January 1, 1837 that Sir Robert Schomburgh, while traveling up the Berbice River, came upon this marvel. The chronicle in his own words reads as follows, "There were gigantic leaves, five to six feet across, flat with a broad rim, lighter green above, and vivid crimson below, floating upon the water; while in character with the wonderful foliage I saw luxuriant flowers, each consisting of numerous petals, passing in alternate tints, from pure white to rose and pink. The smooth water was covered with the blossoms, and as I rowed from one to the other I always found something new to admire. The flower stalk is an inch thick near the calyx, and studded with elastic prickles about three quarters of an inch long. When expanded the four-leaved calyx measures a foot in diameter, but is concealed by the expansion of the hundred petaled corolla. This beautiful flower, when it first unfolds, is white with a pink centre; the colour spreads as the bloom increases in age; and at a day old the whole rose coloured. As if to add to the charm of this noble water lily, it diffuses a sweet scent. Ascending the river we found this plant frequently, and the higher we advanced the more gigantic did the specimens become; one leaf we measured was six feet five inches in diameter, the rim five and a half inches high, and the flowers a foot and a quarter across." Such was the account which Sir Robert published in "Annals of Natural History" for 1828. The Amazon region of British Guiana has produced many strange plants, *Victoria regia* remains the most spectacular. Like the Van Houtte conservatory, Kew has a *Victoria regia* house which supports this luxuriant growth. So sturdy are the mammoth leaves, that a child has been photographed sitting upon one of them!

These monsters, so rarely seen by eyes of man, in all of their grotesquery reveal a splendor unrivaled by the delicate blooms that grace our gardens. Perhaps they are best included with the wonders of the ancient world; like the Collossus of Rhodes, or the Great Pyramid, these wondrous monsters of the plant world transcend the ordinary in a manner so spectacular that to allow them to pass unnoticed would discredit man's brief sojourn through this fantastic world.

Dr. William A. Emboden is Research Associate in Botany, Natural History Museum of Los Angeles County and professor of Biology, San Fernando Valley State College. Dr. Emboden's long awaited book on Narcotic Plants will be on the book stands next month.

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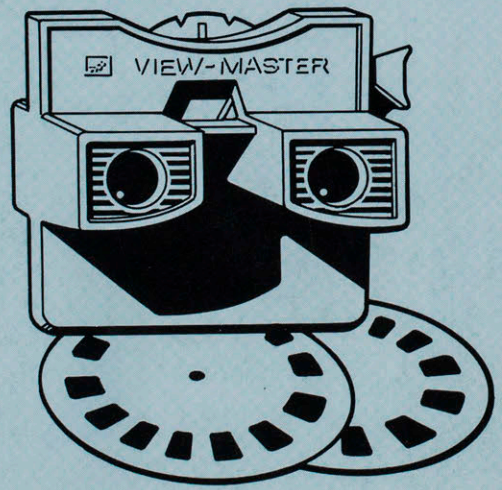

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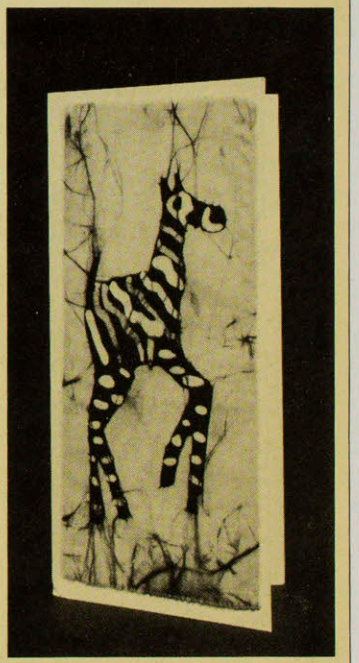

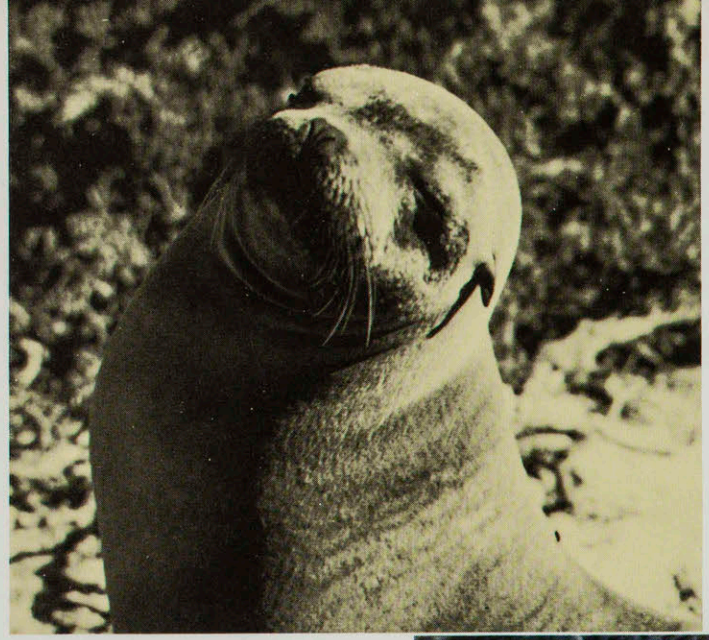

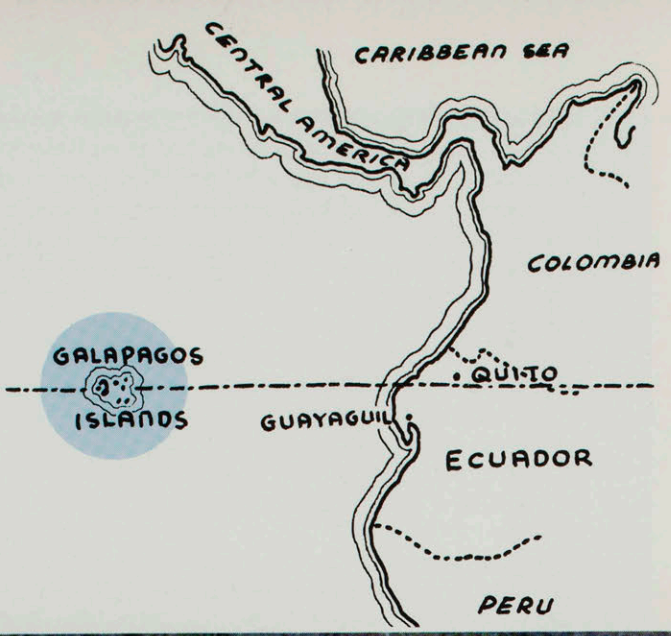

Welcome to the Galapagos

The Albatross builds no nest

Camoflage protects the marine Iguanas from birds of prey

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Photos by Armando Solis

...To bring the world of Natural History and of man...to the community.

of natural history was a prerequisite for survival among primitive people. With the division of labor that accompanied increased cultural sophistication, it became an intellectual concern as well. By need and nature a body of knowledge grew. The nature of faunas and floras became outlined, the relationships between those plants and animals living and those extinct were productively examined, mechanisms of species formation and interrelationships of population structure and diversity, of origin and dispersion, and of genetic composition were revealed. All of these and many more became full, important and essential branches of knowledge, and all had their direct or indirect roots in classical natural history.

Needs change with time. Although some prefer to whitewash as extremist nonsense current concern for man's environment, most do not. If the quality of human life is to improve or even remain the same in coming years, human beings must apply and extend their knowledge of natural history and its offspring sciences; ecology and population biology. Once again, man must call on natural history for new knowledge and concepts to aid him in his own fight for survival.

Natural history is now found under study in the wild and in town, in experimental laboratories and in computer programs and, as always, in museums of natural history. A handful of American museums house the collections of plants and animals on which comparative environmental studies may be based. Your Natural History Museum is one of these—the most important west of the Mississippi. It is the research headquarters for most of the systematists and evolutionary and environmental biologists of the southwest, many of whom are Museum Research Associates (see pp. BR6–8).

In the past two years the life science collection lent 53,000 specimens to investigators throughout the world, and unnumbered thousands more are studied here by staff and visitors. This collection is a recognized national facility, difficult to house and maintain but essential to development in the environmental sciences. The research collections of the Museum and the service functions our staff performs for the biological community complement and sustain our mission in popular recreational education. Even so, adequate support for these collections has been, and will continue to be, difficult to obtain. Somehow it must be done.

How does all of this exploration, collecting, curation, study and specialized service eventually find its way into the public mind and thought? There are three primary channels: our Exhibitions Division, our Education Division, and the Museum's membership group, the Museum Alliance. The exhibitions programs of all good museums of natural history differ markedly from those of, for example, a museum of art. An exhibit cannot simply be collated, hung, expounded upon, and removed. Occasionally our exhibits are formed around a class of objects. More often they are developed around a concept; an area of the natural sciences, a period of history, or a basic principle. They are planned as well around that part of the elementary school curriculum that each will regularly serve. Each exhibit tells a story. Natural objects must be supplemented with models, replicas, graphics, etc. The whole can be most complex and the realization of new galleries the product of years of effort. During the past two years two such have been opened: the completely renovated *Hancock Hall* and *Phantasmagoria: The Movies.*

Other permanent galleries in various stages of completion include a series of history halls that will emphasize the West and Southwest. Two more will exhibit and offer valuable insight into once dominant, but now extinct, forms of ancient reptilian and mammalian life. Still another, the developing *Hall of Marine Ecology,* promises to be the finest of its kind in the world. In addition, your Museum has sought to bring a dynamic program of changing exhibits to the public. For example, *America's Black Heritage* presented unusual cultural material of special interest and concern both to the general populace and specific parts of the community. Others shows, such as *Ancient Art of Veracruz,* were the combined effort of the Museum and an outside group, in this instance the Ethnic Arts Council of Los Angeles. Many other exhibits (p. BR9) were subject oriented—the more easily accomplished display of unusual or especially interesting collections.

While most of our visitors come as individuals or family groups, this Museum has taken responsibility and pride in insuring the best use of our exhibits for education. Our Education Division's teaching program is manned by science specialist, Gretchen Sibley; history specialist, Bruce Lively; school tour director, Mary Jo Marian; and carried through by the finest troupe of Docents ever assembled in any museum. Last year alone, 3,031 classes with some 110,000 students were guided through our halls. Youngsters of all ages, kinds, colors, and capacities received tours planned for their individual needs including, with special preparation, presentations for the handicapped, the blind, the retarded, and the gifted.

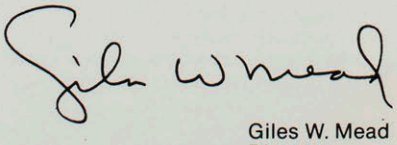
For talented high school students with special aptitudes and interests in the areas of science and history, Miss Sibley and Mr. Lively offer Saturday workshops and seminars that enrich and extend school experience by providing students with specialized professional teaching from museum staff and associates. It's a measure of our success that four of these former students are now on staff here at the Museum.

Our aids to education don't stop there. Even as school children come to the Museum, the Museum's exhibits also go out to thousands of classrooms through our educational Lending Service. Our admission-free Museum Chamber Music Concert brings music of enduring value and historic interest to hundreds of thousands in the southern California area with a regular Sunday broadcast over KFAC. The Documentary Film Series is viewed by more than twenty thousand people at thirty county locations.

The Museum Alliance, our membership group, also helps to bring this Museum to the community. Its able volunteers make possible *Terra,* the outstanding Museum quarterly magazine, special summer classes, guided field trips, gallery openings, surveillance of many special projects such as the paleoecological dig at La Brea, and funding for the occasional purchase of key objects vitally needed for display. Our members are at once our ambassadors to the community and our missionaries. We wish them well as they go forth to enlist new recruits to the Museum's ranks. We need their help, and we have something to offer in return too—a whole new look at the world for just $12.50!

Is all well with your Museum? We wish that it were. The Museum does what it can. We have highlighted a few of its achievements in the foregoing pages. In a singular acknowledgment of professional competence and community service, in June of 1971, the Natural History Museum received accreditation by the American Association of Museums—the only southwestern museum of any kind; history, art, or science, yet to receive such accreditation. We are pleased with accomplishments but disheartened by our inability to keep pace with need. The citizen of this community deserves a museum of natural history at least as good as that provided the citizen of Chicago or New York. He doesn't have it; not yet. Why are we forced to turn down increasingly large numbers of requests for school tours for lack of galleries? Why can't the classic dome of our original sixty-year old building be restored or at least repainted? Why must the grime of millions of hands remain on our travertine walls? Why can't we place on public view, with reasonable assurance of security, additional treasures now safely but unproductively stored in our vaults? Why isn't our building adequate to house in an orderly and efficient manner our study collections? Why must we turn away, intellectually unsatisfied, a half million people each year who come to our famous La Brea locality to see and learn?

Why?



Giles W. Mead
Director

STAFF PARTICIPATION IN HIGHER EDUCATION

Whenever we think we've misplaced a paleontologist we look for a hole in the ground.

Robert L. Bezy, Ph.D.	Adjunct Associate Professor, Biological Sciences, U.S.C.	Herpetology
Theodore Downs, Ph.D.	Adjunct Professor, Geology, U.S.C.; Institute of Evolutionary Biology, U.C.L.A., participating member	Vertebrate Paleontology: Paleomammalogy
David E. Fortsch, B.S.	Instructor (Paleontology-Archeology), Archaeological Professional Training and Educational Program (APTEP) for U.S. Government Dept. of Health, Education & Welfare	Geology; Late Pleistocene Megafauna
Charles L. Hogue, Ph.D.	Adjunct Professor, Biological Sciences, U.S.C.; Associate Professor, Zoology, Cal. State L.A.; Visiting Professor of Biology, Organization for Tropical Studies, Costa Rica	General Entomology; Biosystematics
Robert J. Lavenberg, M.A.	Visiting Professor of Biology (Ichthyology), Universidad de Concepcion Instituto Central de Biologia Adjunct Associate Professor, U.S.C.	Zoology; Oceanic Ichthyology
James H. McLean, Ph.D.	Adjunct Professor, Biological Sciences, U.S.C.	Malacology
Giles W. Mead, Ph.D.	Adjunct Assistant Professor, Biology, U.S.C.	Ichthyology
Donald R. Patten, Ph.D.	Associate Professor II, Department of Anthropology, San Fernando Valley State College	Mammalogy
Charles E. Rozaire, Ph.D.	Adjunct Professor, U.S.C.	Anthropology, Archeology
Kenneth E. Stager, Ph.D.	Adjunct Associate Professor, Biological Sciences, U.S.C.	Zoology; Ornithology
Camm C. Swift, Ph.D.	Adjunct Professor, Biological Sciences, U.S.C.;	Biology; Ichthyology
Fred S. Truxal, Ph.D.	Visiting Professor, Organization for Tropical Studies, Costa Rica; Participating member, Institute of Evolutionary and Environmental Biology, U.C.L.A.	Entomology
John W. Wright, Ph.D.	Adjunct Associate Professor, Biology, U.S.C.	Systematics and ecology of reptiles and amphibians

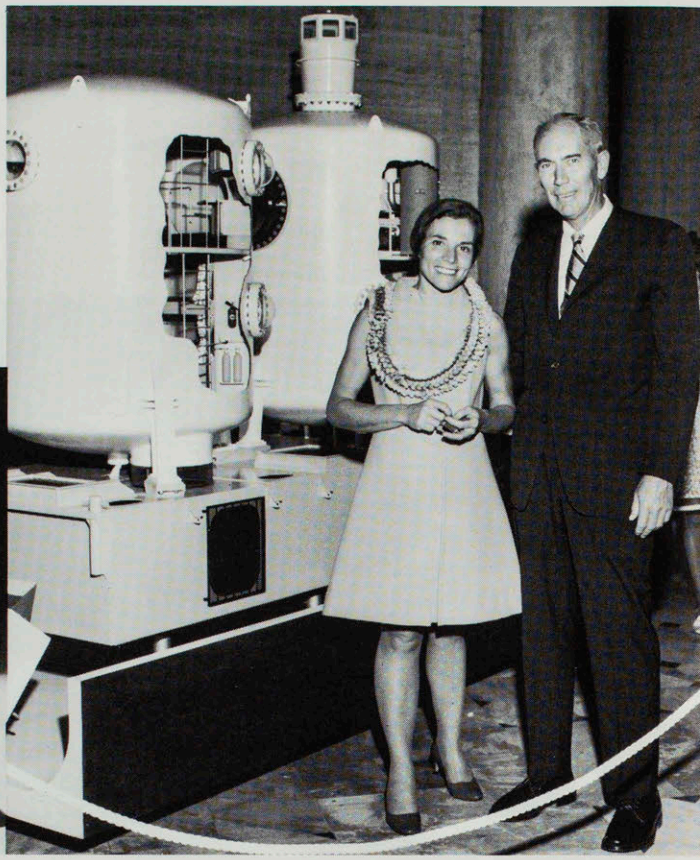
Present Honorary Research Staff

Elbert H. Ahlstrom, Ph.D.	University of California, San Diego	Ichthyology
Carol Wagner Allison, Ph.D.	University of Alaska	Invertebrate Paleontology
Peter Atsatt, Ph.D.	University of California, Irvine	Botany
John N. Belkin, Ph.D.	University of California, Los Angeles	Entomology
Michael A. Bell, B.A.	University of California, Los Angeles	Vertebrate Paleontology
George E. Bohart, Ph.D.	U.S. Dept. Agriculture, Utah State University	Entomology
Arden Brame, M.S.	Eaton Canyon Nature Center, Altadena	Herpetology
Twila L. Bratcher	Natural History Museum of Los Angeles County	Invertebrate Zoology
Bayard H. Brattstrom, Ph.D.	California State College, Fullerton	Vertebrate Paleontology & Herpetology
Ellen Brennan	Natural History Museum of Los Angeles County	Invertebrate Zoology
Donald B. Bright, Ph.D.	California State College, Fullerton	Entomology
Robert Brownell, B.S.	John Hopkins University (Grad. Stu.)	Marine Zoology
Robert D. Burch	Deceased February 22, 1970	Invertebrate Zoology
William A. Bussing, M.S.	University of Costa Rica	Ichthyology
David K. Caldwell, Ph.D.	University of Florida	Ichthyology & Marine Mammalogy
Melba C. Caldwell, M.A.	University of Florida	Ichthyology & Marine Mammalogy
George L. Callison, Ph.D.	California State College, Long Beach	Vertebrate Paleontology & Herpetology
Bruce Campbell, M.D.	Natural History Museum of Los Angeles County	Invertebrate Zoology
Dilford C. Carter, Ph.D.	Texas Technical College	Mammalogy
Richard S. Casebeer, Ph.D.	Natural History Museum of Los Angeles County	Entomology
Crawford Cate, A.A.	Natural History Museum of Los Angeles County	Invertebrate Zoology
Jean Cate	Natural History Museum of Los Angeles County	Invertebrate Zoology
Dilworth W. Chamberlain, B.S.	University of Southern California (Grad. Stu.)	Ichthyology
Beth Chassé	Natural History Museum of Los Angeles County	Vertebrate Paleontology
Randall T. Chew, III, M.S.	La Verne College	Geology-Mineralogy & Vertebrate Paleontology
Robert M. Chew, Ph.D.	University of Southern California	Mammalogy
Nathan W. Cohen, Ph.D.	University of California, Berkeley	Herpetology
Elsie C. Collias, Ph.D.	University of California, Los Angeles	Ornithology
Nicholas E. Collias, Ph.D.	University of California, Los Angeles	Ornithology
Charles T. Collins, Ph.D.	California State College, Long Beach	Ornithology

Melville N. Lincoln	Curator Emeritus, Habitats, Natural History Museum of Los Angeles County	Habitat Groups
Everett Lindsay, Ph.D.	University of Arizona	Vertebrate Paleontology
Jere H. Lipps, Ph.D.	University of California, Davis	Invertebrate Paleontology
Richard B. Loomis, Ph.D.	California State College, Long Beach	Entomology
Neil J. Maloney, Ph.D.	California State College, Fullerton	Vertebrate Paleontology
Leslie Marcus, Ph.D.	Queens College	Vertebrate Paleontology
Lloyd M. Martin	Associate Curator Emeritus, Entomology, Natural History Museum of Los Angeles County	Entomology
John E. Mawby, Ph.D.	Deep Springs College	Vertebrate Paleontology
Roy W. McDiarmid, Ph.D.	University of South Florida	Herpetology
Richard F. McGinnis, B.A.	University of Southern California (Grad. Stu.)	Ichthyology
H. Lawrence McKague, Ph.D.	Gemological Institute of America	Geology-Mineralogy
Kenneth L. McWilliams, Ph.D.	California State College, Fullerton	Entomology
Arnold S. Menke, Ph.D.	U.S. Department of Agriculture	Entomology
Richard H. Merriam, Ph.D.	University of Southern California	Geology-Mineralogy
John R. Meyer, Ph.D.	American School, Honduras	Herpetology
George J. Miller, B.S.	Rancho La Brea Project, Natural History Museum of Los Angeles County	Vertebrate Paleontology
Wade E. Miller, Ph.D.	Fullerton Junior College	Vertebrate Paleontology
Edward Mitchell, Jr., Ph.D.	Fisheries Research Board of Canada	Vertebrate Paleontology & Marine Mammalogy
John L. Mohr, Ph.D.	University of Southern California	Invertebrate Zoology
Ellen James Moore, M.A.	U.S. Geological Survey	Invertebrate Paleontology
William J. Morris, Ph.D.	Occidental College	Vertebrate Paleontology
H. Geoffrey Moser, Ph.D.	NOAA, Bureau of Commercial Fisheries	Ichthyology
Basil G. Nafpaktitis, Ph.D.	University of Southern California	Ichthyology
William B. Neaves, Ph.D.	University College, Nairobi, Kenya	Herpetology
Kenneth S. Norris, Ph.D.	University of California, Los Angeles	Herpetology, Ichthyology & Marine Mammalogy
William T. O'Day, B.A.	University of Southern California (Grad. Stu.)	Ichthyology
Everett C. Olson, Ph.D.	University of California, Los Angeles	Vertebrate Paleontology
Dennis Parnell, Ph.D.	Stanford University	Botany
John R. Paxton, Ph.D.	The Australian Museum	Ichthyology
Edwin M. Perkins, Jr., Ph.D.	University of Southern California	Entomology
William F. Perrin, B.S.	NOAA, Bureau of Commercial Fisheries	Marine Mammalogy
A. Raborn Phillips, Jr., B.S.	Natural History Museum of Los Angeles County	History
Eric R. Pianka, Ph.D.	University of Texas	Herpetology
Theodore Pietsch, M.S.	University of Southern California	Ichthyology
Roy Poorman, M.S.	Natural History Museum of Los Angeles County	Invertebrate Zoology
John H. Prescott, B.A.	Marineland of the Pacific	Vertebrate Paleontology, Ichthyology & Cetology
Catherine Rainwater, B.S.	University of Southern California	Ichthyology
Richard L. Reynolds, B.A.	Natural History Museum of Los Angeles County	Vertebrate Paleontology
Aryan I. Roest, Ph.D.	California State Polytechnic College	Marine Mammalogy
Raymond E. Ryckman, Ph.D.	Loma Linda University	Entomology
Jay M. Savage, Ph.D.	University of Southern California	Herpetology
Robert Schick, Ph.D.	California State College, Los Angeles	Entomology
Konrad F. Schreier, Jr.	Natural History Museum of Los Angeles County	History
Charles S. Schwartz	Natural History Museum of Los Angeles County	History
Donald R. Shasky, M.D.	Natural History Museum of Los Angeles County	Invertebrate Zoology
Gail Shoup, Ph.D.	California State College, Long Beach	Education
Phillip A. Silverstone, Ph.D.	Natural History Museum of Los Angeles County	Herpetology
James D. Smith, Ph.D.	California State College, Fullerton	Mammalogy
Russell J. Smith, M.A.	Chief of Museum Education Emeritus, Natural History Museum of Los Angeles County	Education
Stewart Springer, A.B.	United States National Museum	Vertebrate Paleontology & Ichthyology
Andrew Starrett, Ph.D.	San Fernando Valley State College	Mammalogy
Priscilla Starrett, Ph.D.	University of Southern California	Herpetology
Ian R. Straughan, Ph.D.	University of Southern California	Herpetology
J. Alden Sutherland	Natural History Museum of Los Angeles County	Invertebrate Paleontology
John Swanson, Ph.D.	San Fernando Valley State College	Botany
Richard H. Tedford, Ph.D.	American Museum of Natural History	Vertebrate Paleontology
William L. Theobald, Ph.D.	University of Hawaii	Botany
Spencer Thorpe, A.B.	Natural History Museum of Los Angeles County	Invertebrate Zoology
Philip F. Torchio, M.S.	U.S. Department of Agriculture, Utah State University	Entomology
James E. Trever, B.A.	Natural History Museum of Los Angeles County	Vertebrate Paleontology
Miklos D. F. Udvardy, Ph.D.	California State College, Sacramento	Ornithology
Marshall R. Urist, M.D.	University of California, Los Angeles	Vertebrate Paleontology
Peter P. Vaughn, Ph.D.	University of California, Los Angeles	Vertebrate Paleontology
David B. Wake, Ph.D.	Museum of Vertebrate Zoology, University of California, Berkeley	Herpetology
Boyd W. Walker, Ph.D.	University of California, Los Angeles	Ichthyology
William A. Walker, B.S.	Marineland of the Pacific	Marine Mammalogy
Vladimir Walters, Ph.D.	University of California, Los Angeles	Ichthyology
Janet Warters, Ph.D.	California State College, Long Beach	Earth Sciences
Stuart Warters, Ph.D.	California State College, Long Beach	Vertebrate Paleontology
Mel L. Webster, M.A.	Cerritos College	Invertebrate Paleontology
Robert A. Weinstein	Natural History Museum of Los Angeles County	History
Richard Westcott, M.S.	State Department of Agriculture, Oregon	Entomology
John A. White, Ph.D.	The Museum, Idaho State University	Vertebrate Paleontology & Mammalogy
William R. Wickwire, M.S.	Taft Unified School District	Mammalogy
John G. Williams	Zoological Explorations Limited, Nairobi, Kenya	Zoology
David P. Willoughby, B.A.	Natural History Museum of Los Angeles County	Anthropology & Vertebrate Paleontology
Mildred Wissler, M.A.	Los Angels Valley College	Archeology
G. Davidson Woodard, Ph.D.	Sonoma State College	Geology-Mineralogy
Michael O. Woodburne, Ph.D.	University of California, Riverside	Vertebrate Paleontology
Victor A. Zullo, Ph.D.	University of North Carolina	Invertebrate Paleontology

STAFF RESEARCH IN PROGRESS

These activities are wide ranging and seldom publicly financed, but their ultimate motivation is always rooted in the needs of this community.



History

Mr. Belous: Field archaeology at San Pasqual.

Mr. Dewar: Early California costumes.

Dr. Kelsey Causes of Pontiac's Uprising; American Indian Policy during the Civil War.

Mr. Lively The House and its Speaker: A Study of the Pennsylvania Assembly and Speaker Joseph Galloway, 1750-1784; Assassination in American Politics.

Mr. Mason A biography of Jatinil, Indian Chief of Baja California; the ethnic history of southern California-Negro, Spanish, Mexican, Chinese, and Italian; Japanese internment camp at Manzanar. The Anza Expedition, 1776.

Mr. Reiner The Paintings of Edward Everett.

Mr. Saccone Ancient bronze weaponry and Henry Slotterbeck Gunsmith Los Angeles.

Mr. Teague History of photography and motion pictures.

Mr. Zordich History of the Tourist Automobile Company of Los Angeles and of the Mt. Lowe Railway; biography of Ralph C. Hamlin, pioneer Los Angeles automobile dealer.

Life Science:

Dr. Ariss Cultures of the southern California Indians, with particular reference to the Luiseno Indians.

Dr. Bezy Systematic, evolutionary and chromosomal studies of the lizard families Xantusiidae and Anniellidae and of certain reptiles from Kenya.

Mr. Donahue Revision of *Haploa* and other genera of tiger moths and their allies; taxonomy of the New World Arctiidae.

Dr. Emboden Phylogeny of the androecium in southwestern *Salvia;* the ethnobotany of narcotic plants; the chemical taxonomy of southwestern *Bursera;* and germinative studies in *Salvia: Audibertia.*

Mr. Fortsch Fossil camels from American Falls, Idaho; the Pleistocene vertebrates of China Lake, California; and studies of erosion in badlands environments.

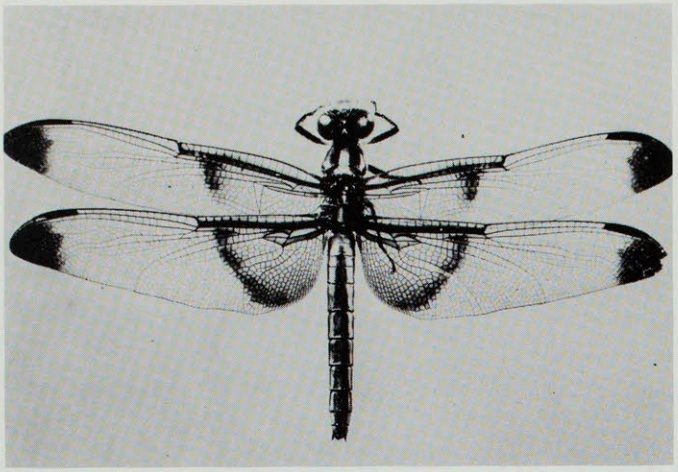
Mr. Fuller A copper sulfide from eastern Canada and a chalcopyrite from the Mt. Pleasant, New Brunswick, tin deposit; and the estimation of the refractive index of tin sections.

Mr. Gustafson Varietal forms of *Lotus scoparius;* medicinal properties of trees, floristic studies of Southwest U.S.A.

Dr. Hogue The biology and taxonomy of arthropod associates of tropical land crabs; and of certain primitive families of aquatic diptera; the insect fauna of southern California, especially the Los Angeles Basin.

Mrs. Langenheim A new Cretaceous coral from the Santa Ana mountains.

PUBLICATIONS BY NATURAL HISTORY MUSEUM STAFF



The list that follows does not include the hundreds of technical and popular writings authored by the Museum's Associates and Research Associates or those by others based on the museum's holdings. It also excludes staff contributions to *TERRA* (formerly the Museum Quarterly), which are listed separately in this report.

Applegate, Shelton P.

1969. A review of Patterson and Greenwood's *Fossil Vertebrates.* Copeia, no. 4, pp. 863-864, December 5, 1969.
1970. The vertebrate fauna of the Selma Formation of Alabama—The Fishes. Fieldiana Geological Memoirs, vol. 3, no. 7, pp. 385-433, figs. 174-204.
1971. Age of Tertiary rocks at Uloa and Umkevelane, Zululand and their geomorphological significance. Geological Magazine, vol. 170, no. 1, p. 89.

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1969. Review of Wheat, Margaret M., Survival Arts of the Primitive Paiutes; in *Southern California Quarterly,* September, 1969, Department of History, University of Southern California, Los Angeles, California.

Belous, Russell E.

1969. America's Black Heritage. (Russell Belous, Editor). History Division Bulletin no. 5, 1969. 64 pp.
1969. Will Soule, Indian Photographer at Fort Sill, Oklahoma, 1869-74. With Robert Weinstein. Ward Ritchie Press. 1969. 120 pp.

Bezy, Robert L.

1970. Chromosomes and evolution of the species groups of *Cnemidophorus* (Reptilia: Teiidae). Syst. Zool. 19: pp. 128-141. (C. H. Lowe, J. W. Wright, C. J. Cole, and R. L. Bezy).
1970. Natural hybridization between the teiid lizards *Cnemidophorus sonorae* (parthenogenetic) and *Cnemidophorus tigris* (bisexual). Syst. Zool. 19: pp. 114-127. (C. H. Lowe, J. W. Wright, C. J. Cole, and R. L. Bezy).

Donahue, Julian P.

1969. Lattin, John D. and Julian P. Donahue, Dec. 1969. The second record of *Picromerus bidens* (L.) in North America (Heteroptera: Pentatomidae: Asopinae). Proc. Entomol. Soc. Washington 71: pp. 567-568.
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1971. The role of introgressive hybridization in the development of *Salvia:* section Audibertia (Labiatae). L.A. Co. Mus. Nat. Hist. Contr. Sci. 208: pp. 1-15.

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1970. The moon rocks. The Complete Rocks, Gems and Minerals, Peterson Publ. Co., Los Angeles, California, pp. 4-5.
1970. An introduction to the rock hobby. The Complete Rocks, Gems and Minerals, Peterson Publ. Co., Los Angeles, California, pp. 10-11.

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1969. Study of the biologies of land crabs and their burrow associates. Assoc. Trop. Biol. Newsletter 18: pp. 9-11. (with D. B. Bright)
1969. Crabhole breeding mosquitoes: News of a project for study of the biologies of land crabs and their burrow associates. Mosq. Syst. Newsletter 1: pp. 72-73. (with D. B. Bright)
1970. Description of a new species of net-winged midge from the Great Basin, with a key to the North American species of the genus *Dioptopsis* (Diptera: Blephariceridae). L.A. Co. Mus. Nat. Hist. Contr. Sci. 178, 10 pp.
1970. Mosquito studies (Diptera, Culicidae) XVII. Two new species of *Deinocerites* from Costa Rica. Contr. Amer. Ent. Inst. vol. 5, no. 1, pp. 9-20. (with A. Adames)
1970. The insect realm: A Guide to the Hall of Insects. L.A. Co. Mus. Nat. Hist. Handbook, 99 pp. (with F. S. Truxal)
1970. A new moth fly of the genus *Psychoda* from crabholes on the Kenya Coast (Diptera: Psychodidae). L.A. Co. Mus. Nat. Hist. Contr. Sci. 204, 5 pp.
1971. Observations on the biology of land crabs and their burrow associates on the Kenya Coast. L.A. Co. Mus. Nat. Hist. Contr. Sci. 210, 10 pp. (with D. B. Bright)

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1970. Ecological groups of deep sea animals off southern California. Bulletin L.A. Co. Mus. Nat. Hist. 6: pp. 1-43. (with A. W. Ebeling, R. Ibara, and F. J. Rohlf)
1971. The food and game fishes of California. University of California Press, 28: 198 pp. (book). (with J. E. Fitch)

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1969. "Los Angeles' Black Community, 1781-1940." With James Anderson. *America's Black Heritage.* History Division Bulletin no. 5, 1969, pp. 40-64.
1969. The Japanese of Los Angeles. Contributions in History, no. 1, 43 pp. (with John A. McKinstry)
1970. The Beginnings of Little Tokyo. Quarterly publication of Asahi-Graph (Tokyo). July, 1970.
1970. Little Tokyo Had Them, Too. Newspaper article in Kashu Mainichi, December 25, 1970.
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Wilson, Edward C.

1969. No new *Ungdarella* (Rhodophycophyta) in New Mexico. J. of Paleo., vol. 43, no. 4, pp. 1245-1247, pl. 146, 1 text fig.

1970. Type specimens of fossil Invertebrata in the Los Angeles County Museum of Natural History, exclusive of Paleoentomology. L.A. Co. Mus. Nat. Hist. Contr. Sci. 181, pp. 1-20. (with D. E. Bing)

1970. *Conocardium langenheimi* sp. n. (Mollusca: Bivalvia) in the Lower Permian Series of the McCloud Limestone, northern California. L.A. Co. Mus. Nat. Hist. Contr. Sci. 184, pp. 1-14, 34 figs.

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1970. Natural hybridization between the teiid lizards *Cnemidophorus sonorae* (parthenogenetic) and *Cnemidophorus tigris* (bisexual). Systematic Zool. vol. 19, no. 2, pp. 114-127. (with Charles H. Lowe, Charles J. Cole and Robert L. Bezy)

1970. Chromosomes and evolution of the species groups of *Cnemidophorus* (Reptilia: Teiidae). Systematic Zool. vol. 19, no. 2, pp. 128-141. (with Charles H. Lowe, Charles J. Cole, and Robert L. Bezy)

1970. A preliminary karyological analysis of scincid lizards. Mamm. Chromo. Newsletter, vol. 11, no. 3, pp. 95-96 + 1 pl. (with James L. De Weese).

1971. *Cnemidophorus neomexicanus* Lowe and Zweifel. *In* Catalogue of North American Amphibians and Reptiles (H. G. Dowling, ed.) (in press)

Shorter scientific papers written by staff and associates are published at irregular intervals, as funds become available. Those that appeared between July 1969 and July 1971 are listed here.

No. 176 The status and habits of Grauer's broadbill in Uganda (Aves: Eurylaemidae), by Herbert Friedmann, 4 pp. January 30, 1970.

No. 177 A new species of *Neadmete* (Neogastropoda) from the Pliocene of California, by Jack D. Mount. 4 pp., 1 fig. February 25, 1970.

No. 178 Description of a new species of net-winged midge from the Great Basin, with a key to the North American species of the genus *Dioptopsis* (Diptera: Blephariceridae), by Charles L. Hogue. 10 pp., 12 figs. February 25, 1970.

No. 179 Geographic variation and systematic status of Mexican lyre snakes of the *Trimorphodon tau* group (Colubridae), by Roy W. McDiarmid and Norman J. Scott, Jr. 43 pp., 7 figs. February 25, 1970.

No. 180 Studies on North American bees of the genus *Hylaeus*. 5. The subgenera *Hylaeus, S. Str.* and *Paraprosopis* (Hymenoptera: Colletidae), by Roy R. Snelling. 59 pp., 12 figs. February 27, 1970.

No. 181 Type specimens of fossil invertebrata in the Los Angeles County Museum of Natural History, exclusive of Paleoentomology, by Edward C. Wilson and Donald E. Bing. 20 pps., 12 figs. February 27, 1970.

No. 182 Aquatic adaptations of the water mouse, *Rheomys underwoodi*, by Andrew Starrett and George F. Fisler. 14 pp. April 17, 1970.

No. 183 Observations and records of *Myotis (Pizonyx) vivesi* Menegaux (Chiroptera: Vespertilionidae), by Donald R. Patten and Lloyd T. Findley. 9 pp. April 17, 1970.

No. 184 *Conocardium langenheimi* Sp. N. (Mollusca: Bivalvia) in the Lower Permian Series of the McCloud limestone, northern California, by Edward C. Wilson. 14 pp., 34 figs. April 17, 1970.

No. 185 Five new epitoniid gastropods from the west coast of the Americas, by Helen DuShane. 6 pp., 5 figs. April 17, 1970.

No. 186 A generic revision and catalog of the western hemisphere Glenurini with the description of a new genus and species from Brazil (Neuroptera: Myrmeleontidae), by L. A. Stange. 28 pp., 8 figs. April 17, 1970.

No. 187 Further studies on audible vocalizations of the Amazon freshwater dolphin, *Inia geoffrensis*, by Melba C. Caldwell and David K. Caldwell. 5 pp., 2 figs. May 4, 1970.

No. 188 Four new terebrid gastropods from the eastern Pacific islands, by Twila Bratcher and R. D. Burch. 6 pp., 8 figs. May 4, 1970.

No. 189 Reinstatement of the turrid genus *Bellaspira* Conrad, 1868 (Mollusca: Gastropoda) with a review of the known species, by James H. McLean and Leroy H. Poorman. 11 pp., 16 figs. May 4, 1970.

No. 190 A new species of fossil *Kelletia* (Mollusca: Gastropoda) from the Lomita Marl, Late Cenozoic of San Pedro, California, by Leo G. Hertlein. 8 pp., 3 figs. May 20, 1970.

No. 191 Studies on the frogs of the genus *Leptodactylus* (Amphibia: Leptodactylidae). VI. Biosystematics of the Melanonotus group, by W. Ronald Heyer. 48 pp., 11 figs. May 20, 1970.

No. 192 Systematics of the lizards of the gekkonid genus *Phyllodactylus* of mainland South America, by James R. Dixon and Raymond B. Huey. 78 pp., 14 figs. June 26, 1970.

No. 193 Hadrosaurian dinosaur bills—morphology and function, by William J. Morris. 14 pp., 5 figs. July 1, 1970.

TERRA

Some of our adventures reach the community... through Terra...

The Museum Alliance, through the efforts of its superb volunteer editor, Mrs. Ewing Seligman, publishes *Terra* (formerly the "Museum Quarterly"). The major articles, primarily semi-popular in nature, are based on, or related to, the interests of this Museum.

Summer 1969 (vol. 8, no. 1)
Tobaccos and Snuffs (William A. Emboden, Jr.)
The Adventure of Mineral Collecting (Barbara V. Lowe)
Itasca Calling KHAQQ (Russell E. Belous)
A Pile of Buildings: Model for the Statehouse (Richard Lipscomb)

Fall 1969 (vol. 8, no. 2)
Tranquilizers and Sedatives from Plants (William A. Emboden, Jr.)
The Wizard of the West (Peter J. Talmachoff)
The Joseph Lee Painting of the Presidio House, San Francisco, 1868 (John Dewar)
Koto, Shakuhachi and Shamisen: a Brief History of Japanese Music (Kayoko Wakita)
Paleopathological Ponderings or How to Tell a Sick Saber-Tooth (J. R. Macdonald and Gretchen Sibley)

Winter 1969-1970 (vol. 8, no. 3)
Los Angeles' Black Heritage (William M. Mason and James Anderson)
Ant Warfare Offensive and Defensive Maneuvers (Roy Snelling)
Uhuru-Harambee Freedom to Work Together (Gretchen Sibley)
1200 Field Assistants (Edward C. Wilson)
Digging Fossil Whales in Mississippi with Southern Hospitality (Shelton P. Applegate)

Spring 1970 (vol. 8, no. 4)
The Ubiquitous Egg,Its Myths, Symbolism and Decoration (Patricia B. Altman)
Rare Tanzanite On Display (Douglas J. Macdonald)
Spike Team and Boe Frame (John Dewar)
The Useful Arts of Africa—Their Methods and Materials (Sage Culpepper Belt)
Chimpanzees, Part I (Maurice A. Machris); Part II (Herbert Friedmann)
California's Gold Discovery,The Record Set Straight (Reverend Francis J. Weber)
Oil, Old Bones and Irony (Dixie P. Myers)

Summer 1970 (vol. 9, no. 1)
"The Whole Shabang Was Great" (Gretchen Sibley)
Our Home Was a Ship...On the Rolling Sea (Robert A. Weinstein)
Vanishing Insects, Insect Camouflage (Fred S. Truxal)
The Rancho La Brea Project: 1969-70 (George J. Miller)

Fall 1970 (vol. 9, no. 2)
Mead Meets the Membership (Giles W. Mead)
The Fabulous Coco-de-mer (William A. Emboden, Jr.)
The Movies (Jack Smith)
As I Remember Moviemaking (John Dewar)
The Aqualung Spider,Birth to Death Under Water (Peter T. Furst)

Winter 1970-1971 (vol. 9, no. 3)
The Ancient Art of Vera Cruz (Hasso von Winning)
Dragon's Blood (William A. Emboden, Jr.)
Friends of the Pleistocene Chihuahua (Edward C. Wilson)
Living on a Coral Reef Nine Fathoms Under (Sylvia A. Earle)

Spring 1971 (vol. 9, no. 4)
Southern California's Magic Mountain Mt. Lowe (James Zordich)
Orchids in Witchcraft and Medicine (William A. Emboden, Jr.)
Tepic—Debut of a Regional Museum (Peter T. Furst)
The Old Plaza Church (John Dewar)
Marconi: Inventor and Entrepreneur (Dixie P. Myers)

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DOCENT PROGRAM

... The finest troupe of Docents ever assembled anywhere.

The Docent program is an activity of the Education Division and was begun in the fall of 1962. Twenty-five women are chosen each year for training in Museum work. The basic training continues for a year and the women are expected to continue their association with the Museum for the following two years, but most remain for many additional years.

Classes are also available for Docents who have completed the first year. As a new gallery opens lectures are scheduled there. Two classes were held during 1969-1971; each class met for ten sessions. The class in comparative anatomy was held both years and the class in Ecology and Animal Behavior was held in 1970-71.

Docent work includes teaching school classes visiting the Museum, curatorial assistance, research for the curators, preparation of some of the study notes for Docents, lectures to adult groups both in the Museum and outside, hostessing, classes for the blind, etc.

The following figures represent the major activities and work hours during 1969-71.

Total Membership	141
(Includes all those working for the two years plus the 1970-71 class in training)	
Executive work	12
Touring (classes, Hancock Park, Braille)	48
Adult Tours and Speaker's Bureau	11
Curatorial Work	28
In Training	27
Honorary or on leave for illness, etc.	15
Hours contributed to the Museum, 1969-70	17,366
Hours contributed to the Museum, 1970-71	20,135
Total	**37,501**

The following women were active during 1969-71 (27 joined during the second year)

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Mrs. Donald Allen (Sally)
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Mrs. Douglas E. Anderson (Anne)
Mrs. Robert Astone (Judy)
Mrs. Roger Ayers (Carolyn)
Mrs. Jon Baldwin (Pat)
Mrs. Zan Ballsun (Doris)
Mrs. Lee Ballsun (Evelyn)
Mrs. Helen Barney
Mrs. Alfred P. Barton (Patsy)
Mrs. Lawrence Bayer (Edna)
Mrs. Gordon Behn (Ruth)
Mrs. Bruce Belt (Sage)
Mrs. William Birdsall (Betty)
Mrs. Elliott E. Blinderman (Barbara)
Mrs. E. Burgess Bramlett (Louise)
Mrs. William H. Branesky (Aurora)
Mrs. Donald Bull (Jean)
Mrs. John B. Callery (Diana)
Mrs. George A. Carroll (Helene)
Mrs. Robert G. Carroll (Norma)
Mrs. Charles Castle (Nancy)
Miss Hope Chevalier
Mrs. Harold N. Clark (Joan)
Mrs. Lane C. Cleaves, Jr. (Mary)
Mrs. Richard L. Cooling (Marjorie)
Mrs. Leonard J. Comess (Elaine)
Mrs. William Cornyn, Jr. (Janet)
Mrs. L. D. Courtright, Jr. (Mary)
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Mrs. Leonard Davis (Sara)
Mrs. Reginald DeCayette (Dorothy)
Mrs. Josephine Lorgion Dominick (Jo)
Mrs. James M. Duvall (Barbara)
Mrs. Neal Dyste (Rosemary)
Mrs. Warren Earl (Helen)
Mrs. Norman Elliott (Jean)
Mrs. Robert Errett (Suzanne)
Mrs. Gordon Evans (Betty)
Mrs. Robert Feinerman (Sunny)
Mrs. Blair C. Filler (Dodie)
Mrs. Alfred Firestein (Shirley)
Miss Bobbe Frankenberg
Mrs. Louis Frasco (Joyce)
Mrs. Herbert Friedmann (Karen)
Mrs. George Garrett (Alice)
Mrs. William I. Gibson (Helen)
Mrs. Bertram Given (Nan)
Mrs. Sherman Given (Dory)
Mrs. Irwin Green (Faye)
Mrs. Oscar Gross (Frieda)
Mrs. Alvin J. Grossblatt (Sunny)
Mrs. Theodor Halpern (Frances)
Mrs. Wynn Hammer (Olga)
Miss Christina Harris
Mrs. William Heidemann (Miriam)
Mrs. Stanley Heller (Frances)
Mrs. Kurt Hirsch (Veronica)
Mrs. James G. Hodges (Marcia)
Mrs. Ralph Hubbard (Fran)
Mrs. Hugh Hudson (Marty)
Mrs. Irving C. Johnson (Dorothy)
Mrs. Carol Jory
Mrs. Alan H. Kapp (Sue)
Mrs. Robert Kealhofer (Susan)
Mrs. Fran Kellough
Mrs. Richard Kleiner (Hortensia)
Mrs. James F. LeSage (Ruth)
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Mrs. Alfred A. Liebman (Sandy)
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Mrs. Herbert Young (Arline)

Centennial Sr. High
Compton Sr. High
Davis Jr. High
Dickison
El Segundo
Emerson
Jefferson
Kelly
Kennedy, Robert
King, Martin Luther
Longfellow
Los Altos
North Lincoln
Park Village
Pioneer
Roosevelt
Tibby
Walton Jr. High
Washington
Willard, F.
Wilson

COVINA VALLEY
Cienega
Covina
Cypress
Fairvalley
Griswold
Grovecenter
Las Palmas
Lomond
Manzanita
Merwin
Mesa
Northview Sr. High
Sunkist
Valencia
Valencia (Deaf)
Washington
Workman

CULVER CITY
Culver
Farragut
El Marino
El Rincon
Linda Vista
Ross, Betsy
Washington

DOWNEY
Downey
Gallatin
Gauldin
Lewis, Ed C.

DUARTE
Burmar
Chaparral Sr. High
Duarte
Duarte Sr. High
Maxwell
Northview Jr. High
Valley View

EAST WHITTIER
Ceres
Evergreen
La Colima
Laurel
Leffingwell
Ocean View
Orchard Dale
Valley View

EL MONTE
Cleminson
Columbia Jr. High
Cortada
Durfee
El Monte Sr. High
Gidley
Le Gore
Mulhall
New Lexington
Norwood
Portrero
Rio Hondo
Rio Vista
Shirpser
Thompson (Handicapped)
Wilkerson
Wright, A. E.

EL RANCHO
El Rancho Sr. High
Pio Pico
Selby Grove

EL SEGUNDO
Center St.
El Segundo Jr. High
El Segundo Sr. High
Imperial
Richmond St.

ENTERPRISE
Bunche, Ralph
Enterprise
McKinley
Pioneer
Twain, Mark

GARVEY
Dewey
Duff
Emerson
Fern
Garvey
Garvey Jr. High
Hillcrest
Marshall
McKinley
Monterey Vista
Rice
Willard
Williams, Dan

GLENDALE
Dunsmore
Edison
Field
Jefferson
Mann, Horace
Monte Vista
Muir, John
Verdugo Woodlands

GLENDORA
Goddard Jr. High
La Fetra
Muir, John

HACIENDA LA PUENTE
Amar
Barrows
Bixby
Cedarlane
Del Valle
Dibble
Fairgrove Jr. High
Glenelder
Grazide
Hillgrove
Kwis
La Subida
Lassalette
Los Altos
Los Robles
Mesa Robles
Nelson, Ada
Palm
Shadybend
Sierra Vista
Wedgeworth
Workman

HAWTHORNE
Eucalyptus
Jefferson
Washington
Williams
Yukon Jr. High

HERMOSA BEACH
North
Prospect Heights
South

INGLEWOOD
Center Park
Centinela
Freeman
Highland
Inglewood Sr. High
Kelso
La Tijera
Lane
Oak St.
Parent
Payne
Woodworth
(Cerebral Palsy)

LA CANADA
La Canada
Oak Grove
Paradise Canyon

LA PUENTE
Nogalez Sr. High
Rowland Sr. High
Walnut Sr. High

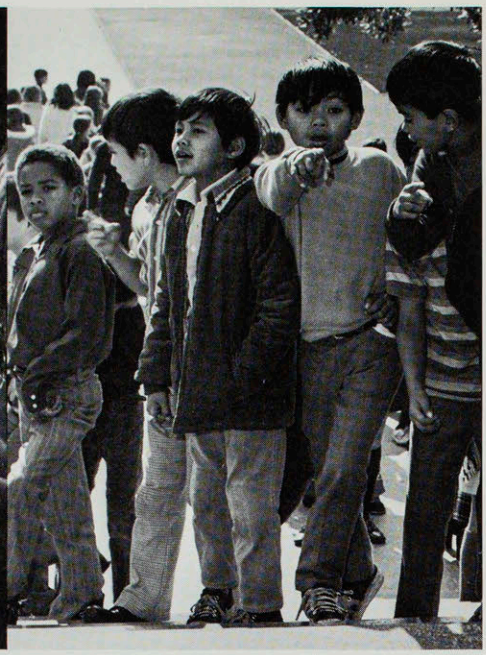
LAS VIRGENES
Agoura Sr. High
Round Meadow
White Oaks
Wright, A. E.
Wright, A. E. Jr. High
Yerba Buena

LAWNDALE
Carson, Kit
Ross, Betsy

LENNOX
Buford
Jefferson
Larch Ave.
Whelan

LITTLE LAKE
Cresson
Durfree
Fairford
Gettysburg
Jersey
Lakeland
Lakeview
Orr, William
Paddison
Studebaker

LONG BEACH
Barton
Burnett
Edison
Five Acres
Gant
Henry
Hudson
Lincoln
Long Beach Pre-Schl.
Los Cerritos
Lowell
Madison
Newcomb
Polytechnic Sr. High
Prisk
Roosevelt
Signal Hill
Twain
Whittier, John



Parthenia St.
Paseo del Rey
Pasteur Jr. High
Plainview Ave.
Platt Ranch
Playa del Rey
Plummer
Pt. Fermin
Pomelo Drive
Prairie St.
President Ave.
Queen Anne Place
Ramona
Raymond Ave.
Reseda El.
Reseda Sr. High
Rhoda St.
Richland Ave.
Rinaldi St.
Rio Vista
Riverside Drive
Rogers, Will
Roosevelt
Roosevelt Jr. High
Roosevelt Sr. High
Roscoe
Rosewood
Ross, Betsy Sr. High
Rowan Ave.
Russell St.
San Fernando
San Fernando Jr. High
San Fernando Sr. High
San Gabriel
San Jose
San Pascual
San Pedro
San Pedro Sr. High
Santa Monica
Saticoy
Saturn St.
Sellery (Handicapped)
Selma Ave.
Sepulveda
Serrano Ave.
Sharp Ave.
Sheridan St.
Shirley Ave.
Short Ave.
Sierra Park
Sierra Vista
South Gate Jr. High
South Park
South Shores
Stanford Ave.
Stevenson Jr. High
Stoner Ave.
Stonehurst
Strathern St.
Taper Ave.
Telfair Ave.
Toland Way
Toluca Lake
Topanga
Topeka Dr.
Trinity St.
Tulsa St.
Tweedy
Utah
Valerio St.
Valley View
Vanalden Ave.
Van Deene Ave.
Van Gogh St.
Van Ness Ave.
Van Nuys
Venice Sr. High
Verdugo Sr. High
Vernon City
Vine St.
Vinedale
Vintage
Wadsworth Ave.
Weigand St.
Welby Way
West Athens
West Hollywood
Western Ave.
Western Sr. High
Westminster
Westwood
White Pt.
Wilbur Ave.
Wilmington Park
Wiltern Place
Windsor Hills
Winnetka Ave.
Wonderland
Woodcrest
Woodlake
Woodland Hills
Woodlawn Ave.
1st Street
2nd Street
3rd Street
4th Street
6th Street
7th Street
10th Street
24th Street
28th Street
32nd Street
36th Street
49th Street
54th Street
59th Street
61st Street
66th Street
75th Street
93rd Street
96th Street
97th Street
98th Street
99th Street
102nd Street
107th Street
109th Street
111th Street
112th Street
153rd Street
186th Street
232nd Place

LOS NIETOS
Aeolian
Los Nietos
Los Nietos Jr. High
Nelson, Ada
Rancho Santa Gertrudes
Wiggins, Wallace

LOWELL JOINT
El Portal
Grovedale
Hacienda
Jordan
Lowell Sr. High
Maybrook
Meadow Green
Middleton
Olita

LYNWOOD
Abbott
Hosler Jr. High
Lincoln
Lindbergh
Lynwood Sr. High
Rogers, Will
Roosevelt
Twain, Mark
Washington
Wilson

MANHATTAN BEACH
Begg Jr. High
Center Jr. High
Grand View
Manhattan Heights
Meadows Ave.
Pacific
Pennekamp

MONROVIA
Bradoaks
Huntington
Mayflower
Monroe
Monrovia
Monrovia Sr. High
Santa Fe
Wild Rose

MONTEBELLO
Bandini
Bell Gardens
Bella Vista
Colmar
Fremont
Garfield
Grandview
Greenwood
La Merced
Live Oak
Montebello Gardens
Montebello Park
Montebello Sr. High
Suva St.
Winter Gardens

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Maxson
Miramonte
Mountain View El.
Mountain View Sr. High
Parkview
Payne, Willard

NEWHALL
Newhall El.
Old Orchard
Peachland

NORWALK-LA MIRADA
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Benton Jr. High
Dolland
Dulles
Eastwood
Elmcroft
Foster Rd.
Glazier
Glenn, John Jr. High
Hargitt
Hoxie Ave.
Hutchinson
Johnston
Kling
La Mirada
La Pluma
Lincoln
Los Alisos
Los Coyotes Jr. High
Mesa
Moffitt
Morrison
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Norwalk (Deaf)
Nottingham
Nuffer
Ramona
Rancho
Waite
Wright Jr. High

PALOS VERDES
Ladera Linda
Margate
Montemalaga
Pedregal
Point Vicente
Rancho Vista
Ridgecrest Jr. High
Silver Spur
Vista Grande

PARAMOUNT
Hollydale
Lincoln
Wirtz, Harry

PASADENA
Altadena
Arroyo Seco
Audubon
Blair Sr. High
Bonito Sr. High
Edison
Garfield
Hale
Hamilton
Jackson
Jefferson

Christ Lutheran
Clairbourn
Cleland House
Conley Jr. High
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Crescent Bay
Curtis
De La Salle
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Egremont
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Emblem EMR
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Emelita
Emmanuel Baptist
Escalona
Estock, Helen
Fairfax Parent El.
Fairmont
Fairmont, Anaheim
Faith Lutheran
Faith Lutheran, Ingle.
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First Baptist
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Garden Grove Christian
Glendale S.D.A.
Good Shepherd Lutheran
Harbor Day
Harding Academy
Hathaway
Hillel Hebrew
Holy Angels
Holy Cross
Holy Family
Holy Family, Wilmington
Holy Family Jr. High
Holy Spirit
Holy Trinity
Huntington
Immaculate Heart of Mary
Immanuel Lutheran
Imperial Sr. High
Incarnation
Inglewood Christian
Kennedy Child Care Ctr.
Lady of Loretto
Las Posas
Las Vegas Day
Las Virgenes Day
Laurel Hall
Laurence School
Loma Linda
Loma Vista
Los Angeles Baptist Sr. High
Los Angeles Union S.D.A.
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MacLaren Hall
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Manchester Baptist
Martin, Glen
Mary Immaculate
McKewen, Colin
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Mission Grammar
Mirman
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Montessori, Child Ctr.
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Montessori, Van Nuys
Mt. Carmel Sr. High
Mt. Olive Lutheran
Nativity
Nativity, El Monte
Nazarene Christian
Notre Dame Sr. High
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Panorama Baptist
Pasadena Christian
Pasadena Town & Country
Pico Gardens Pre-School
Pilgrim
Pinecrest
Pinecrest, Northridge
Pinecrest, Sherman Way
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Redeemer Baptist
Redeemer Lutheran
Regina Calla
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Ridgewood Military Academy
Riviera Hall
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Rolling Hills Day School
St. Aloysius
St. Athanasius
St. Ambrose
St. Angela Mierci
St. Anthony
St. Augustine
St. Augustine by the Sea
St. Barnabus
St. Bartholomew
St. Bede's
St. Bellamine
St. Benedict
St. Bonaventure
St. Boniface
St. Brendon's
St. Catherine of Siena
St. Cecilia
St. Charles
St. Christopher
St. Columbian
St. Elizabeth
St. Euphrasia
St. Francis de Salle
St. Francis of Assisi
St. George
St. Genevieve
St. Gregory
St. Gregory the Great
St. Jerome's
St. Jerome de Lastonac
St. Joachim
St. John Baptist, Newport Mesa
St. John Chrysostom
St. John Fisher
St. John's Lutheran
St. John's, Montebello
St. Joseph's
St. Juliana's
St. Laurence Martyr
St. Louis of France
St. Margaret Mary
St. Mark's, Altadena
St. Mark's Day School
St. Mark's Lutheran
St. Mary's
St. Mary's, Fullerton
St. Matthew's
St. Matthew's Episcopal
St. Mel's
St. Monica's
St. Monica Sr. High
St. Patricia
St. Paul's
St. Paul's Lutheran
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St. Philip of Neri
St. Pius V
St. Raphael's
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St. Thomas
St. Turibius
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San Gabriel Academy
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Transfiguration
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Trinity First Lutheran, Van Nuys
Trinity Lutheran, Hawthorne
Valley Academy
Valley Christian
Verbum Del Sr. High
Victor Valley Christian
Viewpoint School
Village Christian
Vista del Mar Girl's School
Walden
Westchester Lutheran
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Westlane
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Westminster Pre-School
Westside Academy
Wingrock
Woodworth, Clyde

MUSEUM NATURAL SCIENCE WORKSHOP

For talented high school students with special aptitudes and interests in science...

The Museum Natural Science Workshop is under the direction of the Division of Education and a joint activity with the Science Divisions. It has been in existence since 1944 and trained about 3500 students. The program is designed for outstanding high school science students in grades 9 through 12. The courses of study and activities are designed with the following purposes in mind:

1. To augment school science curriculum in science areas of the Museum.
2. To provide an opportunity for students to work in an informal atmosphere with trained scientists.
3. To provide students with the opportunity to become acquainted with, and work with, other students with similar interests.

A series of lectures is given to all beginning students to acquaint them with the sciences at the Museum and give them prerequisite background information. During the second semester 13 classes are offered to allow students to study particular fields of choice in more depth. They may take additional courses as long as they are in high school.

Classes are held in the following fields:

Anthropology
Comparative Anatomy
Entomology
Herpetology
Ichthyology
Invertebrate Marine Zoology
Invertebrate Paleontology
Mammalogy
Mineralogy
Ornithology
Vertebrate Paleontology
Research
Scientific Illustration

Several surveys of alumni indicate about 87% continue in fields of science, and many attribute their choice to their contact with the Museum. Four present staff members are alumni of the Workshop.

Figures for 1969-70

Schools represented from 24 school districts:
junior high 32
senior high 43
Total **75**
Students accepted:
junior high 75
senior high 83
Total.....**158**
Students graduated **145**
Attendance at 8 Museum Association Meetings:.....**460**
(Student conducted meetings where student research is discussed)

Figures for 1970-71

Schools represented from 25 school districts:
junior high 29
senior high 35
Total **64**
Students accepted:
junior high 68
senior high 78
Total.....**146**
Students graduated **141**
Attendance at 8 Museum Student Association Meetings.....**475**

Classes:

Fall: 20 lectures
Spring: 9 class meetings for 13 classes, about 14 students per class

Volunteer Work

No close records are kept, but each year several hundreds of hours are contributed by students during weekends and school holidays.

DOCUMENTARY FILM SERIES

The Documentary Film Series completed its twentieth year at the end of May, 1971.

Films shown in the season 1969-70 were: October, *Dr. Leakey and the Dawn of Man* and *A Place to Stand;* November, *Born Free;* January, *An Approach to the Prediction of Earthquakes;* February, *State Fair;* March, *Grizzly;* April, *Kings Row;* May, *Voyage to the Enchanted Isles.*

The 1970-71 Series exhibited: October, *Born Free;* November, *An Evening with the Royal Ballet;* January, *What Are We Doing to Our World? The Winners* and *On the Road with Charles Kuralt;* February, *The Road to Gettysburg* and *Lincoln's Last Day;* March, *The Amazon* and *Animal War: Animal Peace;* April, *Naughty Marietta;* May, *Report From Uganda and Chopi Africa.*

The Documentary Film Series is an activity of the Education Division and has become an extension service of the Museum by going into the community through the Museum Documentary Film Circuit. This film circuit has grown voluntarily throughout the years through requests of communities to show these Museum films in their own localities. Each film-bill is now shown in 26 localities within a span of one month. For seven months from October through May (excluding December) the Museum provides a film program each month for the Film Circuit.

The films are provided free by the Museum and transportation and projectionist are provided by the localities when the films play.

Admission to all showings is free.

Attendance at the films:
for 1969-70 27,143
for 1970-71 20,676

Below is a list of the locations where the films play on Circuit.

Altadena Public Library
Arcadia Public Library
Beverly Hills Public Library
Burbank Public Library
East Los Angeles City College
Glendale Public Library – Crescenta Valley Branch
Hawthorne Public Library
Hollywood – Los Angeles City College
Long Beach City College
Montebello Public Library
Natural History Museum
Northridge – San Fernando Valley State College
Norwalk – Cerritos College
Palos Verdes Public Library
Pasadena Public Library
Pomona Public Library – Cal State Polytechnic College
Rosemead Public Library
Santa Monica Public Library
Sierra Madre Public Library
South Pasadena Public Library
Torrance Public Library
Van Nuys – Los Angeles Valley College
West Covina Public Library
West Los Angeles – Regional Library & Felicia Madhood Senior Citizens Center
Whittier Branch Library – Whittier Recreation Center

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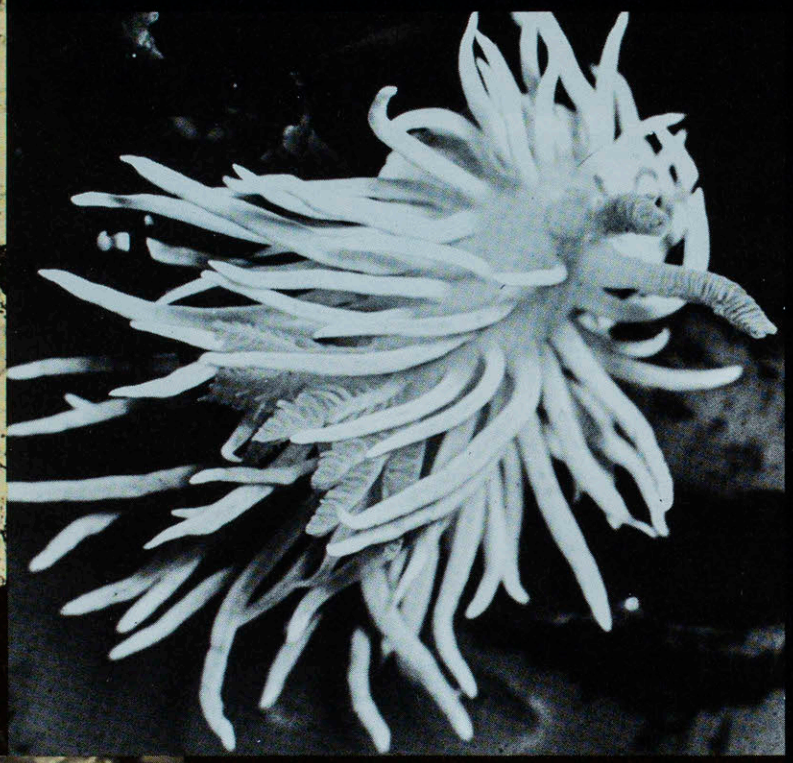
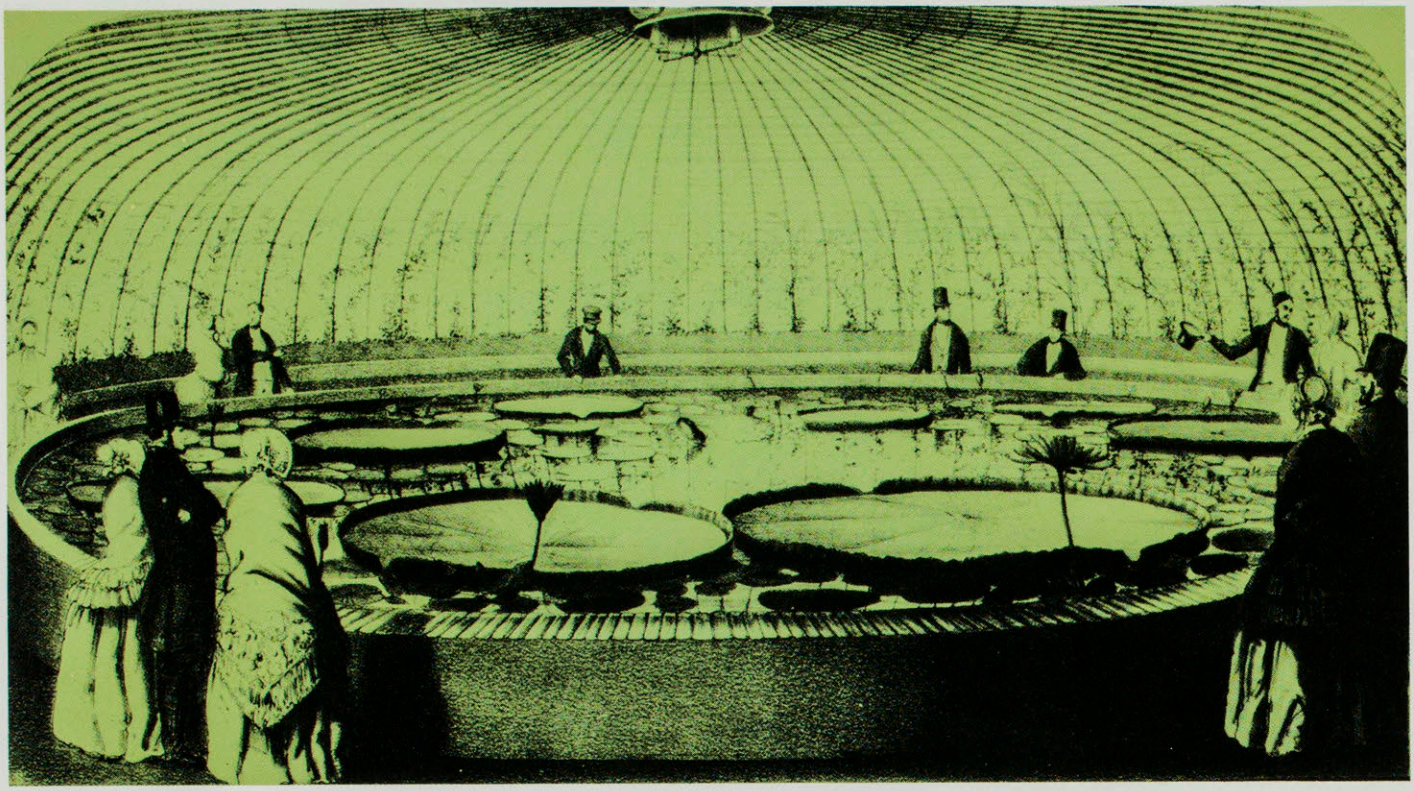




Victoria regia — growing in the conservatory of Van Houtte in Holland

Monstrous Plants

by **William A. Emboden, Jr.**

Amorphophallus titanum — monstrous inflorescence from Sumatra in bloom

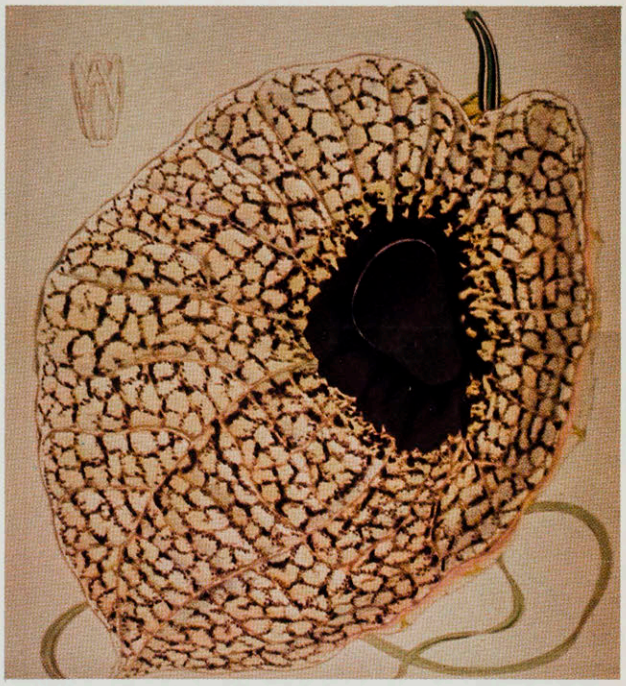
Amorphophallus titanum — vegetative shoot which alternates with the inflorescence in making an appearance

ture of rotten fish and burnt sugar." Note is made that many bottle flies were attracted to the flower. It is this strange erect spadix that bears simple male parts above and female parts below (see accompanying plates). The whole effect was both bizarre and erotic.

Was the flowering of such a plant worthy of the attendant notoriety, or was the provincial world of the nineteenth century easily astonished? If we read accounts of a similar event in New York in 1937, the flurry of attention at Kew seems minor. A corm which was shipped from Sumatra to the New York Botanical Gardens in 1932 had undergone vegetative development for five successive years without any alternating floral show; then on May 26, 1937 it was revealed to the public that flowering had been initiated. Within days the press arrived at the hothouse to cover the event. After all, it was to be the first time in the Western Hemisphere that "the world's largest flower" had come into bloom. Because of the size of the corm, it also promised to be the largest ever brought into bloom under cultivation anywhere in the world. The press of all of the major newspapers in the nation swarmed into the tropical aquatic house where the plant was being grown, and Paramount Studios brought in their cameras to film the epiphany. Newscasters broadcast the event so that thousands of visitors waited in lines to see a phenomenon as rare and as strange as the current exhibit of moon rocks. Soon half a dozen other film companies moved in, superstructures were built and lights blazed around the enshrouded shoot. On June 6 many of the photographers and film makers gave up their night-long vigils in a suffocating humidity and temperatures which were 96 degrees. The Paramount man stayed and on June 7 he was rewarded with the spectacular event of the "birth" of the monstrous flower. Miss Fleda Griffith, staff photographer for the Botanical Garden, also remained on to make constant records with her camera of the floral morphogenesis. As the inflorescence unfurled the public and press was alerted and the lines formed. Carol H. Woodward recorded the event for the Journal of the New York Botanical Garden (August, 1937). "What they saw when the spathe was open was somewhat the form of a gigantic upturned morning glory, 4 feet across and nearly 13 (feet) in circumference, the rim deeply fluted, the irregular edges ruffled, an enormous tall yellow spadix rising out of its center. This magnificent spathe was lined with deep maroon, which at close range (to be seen only by climbing a ladder and peering inside) seemed to run into the greenish-yellow area which lay below it as though one color had been washed into another. The dark maroon turned to a deep red as the flower grew older. Outside the spathe was light green with irregular spots and occasional other markings of white. Just before opening, the fluted portion turned almost livid in hue."

A window was cut in the base of the spathe so that scientists could look into the enormous inflorescence and see the flowers proper and so that Miss Margaret Sorensen could paint the flowers in proper color. What she saw was a compact mass of 4,800 ivory colored male flowers just under a wide bulge in the spadix. Beneath these were spiral tiers of 700 flask-shaped female flowers of a yellowish-orange ovary, a red style shading to carmine, then to a small zone of cobalt violet, and a stigma of dark olive-green capping the style. These female organs were arranged against a spadix back-

Aristolochia grandiflora — the flower in profile. From base to apex it measures over 2½ feet



Aristolochia grandiflora — in face view

torture device. The whole of the flower is anchored to the root of its host from which nourishment is derived. Interestingly enough, the vascular system of the host *Tetrastigma* enters that of the *Rafflesia.*

In July of 1818 Sir Stamford and Lady Raffles, under the patronage of the President of the Royal Society, and with the aid of the naturalist, Dr. Joseph Arnold, penetrated the interior of Sumatra to the Mann River at Pulo Lebbar. It was here the trio encountered what remains today as the world's largest flower. The awesome sight must have been overpowering, for within a few days Dr. Arnold died of fever but not before "poor Arnold" had the opportunity to pen this letter to an unidentified friend. "I rejoice to tell you what I consider as the greatest prodigy of the vegetable world. I had ventured some way from the party, when one of the Malay servants came running to me with wonder in his eyes, and said, 'Come with me, sir, come! a flower, very large, very beautiful, wonderful!' I immediately went with the man about a hundred yards in the jungle, and he pointed to a flower growing close to the ground under the bushes, which was truly astonishing. My first impulse was to cut it up and carry it to the hut. I therefore seized the Malay's parang (a sort of instrument like a woodman's chopping hook), and finding that it sprang from a small root which ran horizontally (about as large as two fingers, or a little more), I soon detached it and removed it to our hut. To tell you the truth, had I been alone, and had there been no witnesses, I should I think have been fearful of mentioning the dimensions of this flower, so much does it exceed every flower I have ever seen or heard of; but I had Sir Stamford and Lady Raffles with me, and a Mr. Palsgrave, a respectable man resident at Manna, who though equally astonished with myself, yet are able to testify as to the truth." Arnold goes on to describe the plant and the flies hovering over the nectarium or bowl of the flower. It was estimated to have weighed fifteen pounds. With regard to pollination, Dr. Arnold mentioned that the ground around the giant flower was littered with elephant excrement. This led to a later hypothesis that the plants were actually pollinated by elephants! Needless to say, the hypothesis has never been vindicated.

Drawings of the flower were made and later published as engraved plates, seventeen in all, in the folio *Miscellaneous Botanical Works of Robert Brown* Volume III Atlas (1868). It was Robert Brown who gave the monster its generic and specific names, *Rafflesia arnoldii* noting, "It is proposed in honour of Sir Stamford Raffles, to call this genus *Rafflesia,* the name I am persuaded that Dr. Arnold himself would have chosen had he lived to publish an account of it."

In 1850 the explorer Humboldt wrote of another monster in his *Views of Nature,* "On the shady banks of the Magdalena River in South America, grows a climbing *Aristolochia (A. grandiflora),* whose blossoms measuring four feet in circumference, the Indian children sportively draw on their heads as caps." This plant has been called "pelican flower" from the resemblance of its young and unopened flowers to the head of a pelican. In Brazil, where these "birthworts" are numerous, they are said to resemble large mottled handkerchiefs put out on the bushes to dry. The color is a patchy purple-brown inside and a pale yellow-green outside, and the odor is described simply as "disgusting," giving it something more in common with the afore-

THE HONEY BADGER

and THE HONEY GUIDE

by **Herbert Friedmann**

The new addition to the Museum's series of habitat groups of African mammals not only presents a hitherto unexhibited animal, but also displays a unique type of cooperative relationship, or symbiosis, between two wholly separate organisms, a mammal, the honey-badger or ratel, and a bird, the greater honey-guide. In the group the two creatures are shown at the entrance of a wild bees' nest, and it is with relevance to such a spot that the foraging habits of the two converge. The fact that both have the word honey in their common names would, in itself, inform us that they have a common interest in this substance, which, of course, occurs in nature only as part of the contents of bees' nests.

Ever since the middle of the sixteenth century when Europeans began visiting Africa and studying its natural history, they have repeatedly told the story of how they, or their native assistants, were led by a little bird to a wild bees' nest, and how the natives were always eager to follow the bird, as by so doing they knew they would arrive at the source of honey, the only natural "sweet" available to them. So numerous and so similar were these independent accounts from travelers who had had this experience, or had heard of it, in widely separate parts of Africa that the "guiding" behavior of the bird became an accepted part of the natural history lore of the dark continent.

The account usually described how the bird would fly toward the individual, or toward the safari, and begin to chatter and then fly off to a nearby tree, anywhere from ten to fifty feet away, where it would wait for them, chattering all the time. As its human followers came near, the bird would then fly off to another tree and repeat the performance, which would go on and on until the bird came to a bees' nest. Then it would become silent and would perch quietly nearby and wait for its followers to chop open the hive, take what they want, and depart. Then the bird would come down from its perch and feed on the bits of honeycomb left strewn about the opening.

Because of the natives' understandable interest in the honey, to which they had been led, and because of their observations of the bird itself feeding on bits of the honeycomb, the bird came to be known to Europeans as the honey-guide. It was further assumed, in subsequent writings about it, that the bird fed largely, if not wholly,